

# ANTIARMOR ORGANIZATION AND TACTICS

Subcourse Number IN0543

EDITION B

United States Army Infantry School  
Fort Benning, Georgia 31905-5593

Five Credit Hours

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## SUBCOURSE OVERVIEW

This subcourse is designed to teach you how to identify the organization and elements of an antiarmor battalion; how to identify and engage targets; how to plan and prepare for offensive operations; how to plan and prepare for defensive operations; how to identify positions on the battlefield and special missions; how to operate in a nuclear, biological, and chemical (NBC) environment; and how to identify the types and characteristics of TOW missiles.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine which was current at the time it was prepared. In your own work situation, always refer to the latest publications.

The words "he", "him", "his", and "men", when used in this publication, represent both the masculine and feminine genders unless otherwise stated.

## TERMINAL LEARNING OBJECTIVE

**TASK:** You will be able to identify the organization and elements of an antiarmor battalion; to identify and engage targets; to plan and prepare for offensive operations; to plan and prepare for defensive operations; to identify positions on the battlefield and special missions; to operate in a nuclear, biological, and chemical (NBC) environment; and to identify the types and characteristics of TOW missiles.

**CONDITIONS:** You will have information from [FM 7-91](#).

**STANDARDS:** You will identify the organization and elements of an antiarmor battalion; identify and engage targets; plan and prepare for offensive operations; plan and prepare for defensive operations; identify positions on the battlefield and special missions; operate in a nuclear, biological, and chemical (NBC) environment; and identify the types and characteristics of TOW missiles in accordance with [FM 7-91](#).

## TABLE OF CONTENTS

[Subcourse Overview](#)

[Lesson 1: Organization and Elements for an Antiarmor Battalion](#)  
[Practice Exercise](#)

Lesson 2:    Target Identification and Engagements and Planning for Offensive and Defensive Operations

Part A: Target Identification and Engagements

Part B: Plan and Prepare for Offensive Operations

Part C: Plan and Prepare for Defensive Operations

Practice Exercise

Lesson 3:    Identify Battlefield Positions and Special Missions and Operate in an NBC Environment

Part A: Identify Positions on the Battlefield and Special Missions

Part B: Operate in an NBC Environment

Practice Exercise

Lesson 4:    Type and Characteristics of TOW Missiles

Practice Exercise

## LESSON ONE

### ORGANIZATION AND ELEMENTS OF AN ANTIARMOR BATTALION

#### OVERVIEW

##### **TASK DESCRIPTION:**

In this lesson, you will learn how to identify the organization and elements of an antiarmor battalion.

##### **LEARNING OBJECTIVE:**

**TASKS:** Identify the organization and elements of an antiarmor battalion.

**CONDITIONS:** You will be given access to information from [FM 7-91](#).

**STANDARDS:** Identify the organization and elements of an antiarmor battalion in accordance with [FM 7-91](#).

**REFERENCES:** The material contained in this lesson was derived from the following publication:

[FM 7-91](#)

#### INTRODUCTION

For defense against enemy tank and motorized threat, all battalions are equipped with at least one antiarmor company. Organized in various ways. This lesson will teach you how to identify organization and elements of an antiarmor battalion.

##### 1. Background.

The development and refinement of material, technology, and tactics continue to change the complexion of the modern battlefield. Threat forces throughout the world increase their ability to locate and destroy an enemy force. Advances in technology constantly create new families of weapons, communications, and surveillance devices. This technology also produces weapons which are more lethal and which are accurate at greater ranges. Developments in automotive research contribute to the improved mobility of maneuver units.

a. Airland Battle Concept. The concepts and basics of Airland Battle apply to antiarmor units in much the same way as they do to maneuver units. Neither tanks nor antiarmor systems operate alone on the battlefield. They operate along with infantry, armor, and other elements of the combined arms team. The long-range fires of antiarmor units make them important to destroying the integrity of an enemy's combined arms team.

(1) TOW Doctrine. The key to the employment of a unit's antiarmor assets is mass. When terrain and fields of fire allow, TOW platoons should be controlled by the antiarmor commander. This commander plans and directs antiarmor fires in concert with the battalion commander's scheme of maneuver. This means that TOW systems are seldom task organized out to the line companies. If TOW platoons are massed, tanks need not be employed as the main antiarmor platform. Employing antiarmor systems in areas once covered by tanks releases more tanks to go where their speed and shock

effect are needed. Also, using antiarmor systems in support-by-fire frees more tanks to maneuver.

(2) Historical Perspective. World War II battles provide historical examples of the successful employment of dedicated, less-mobile, massed antitank units. Towed 50-mm guns used by the Germans at Sid-Bou-Zid caused an American attack to fail. German antitank fires employed as a Pakfront destroyed 51 of 54 Sherman tanks and 16 half-tracks. The Pakfront was adopted by the Russians, who used it against the Germans at Kurst. By Soviet accounts, antitank guns destroyed 75 percent of the German tanks that were killed.

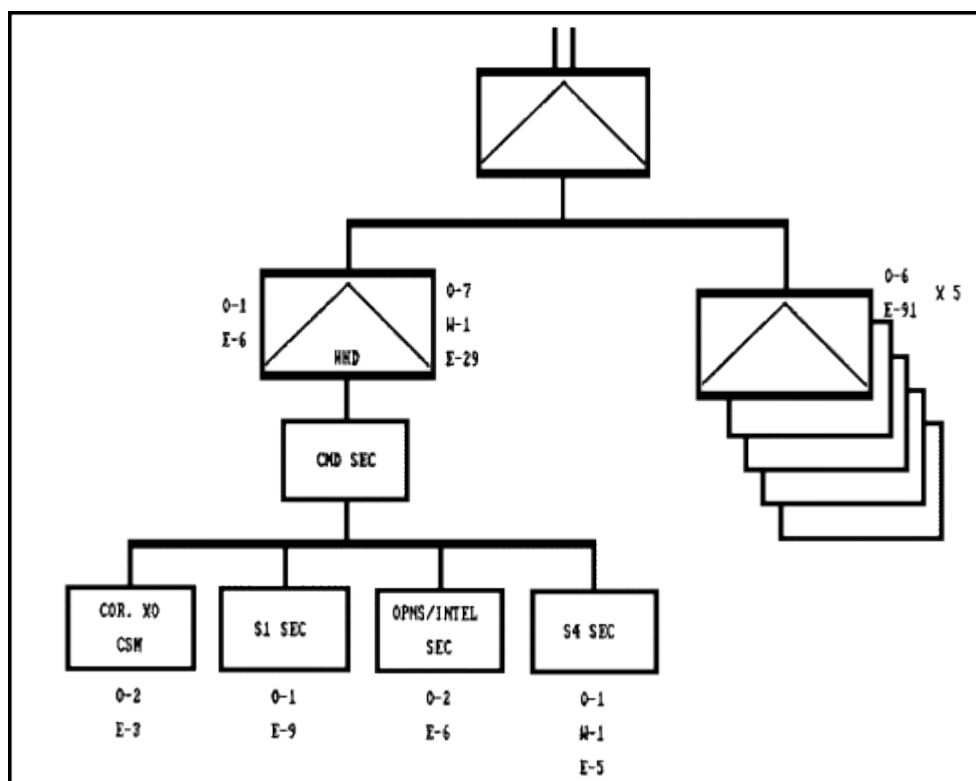
(3) Massed Fires. Commanders in US forces have traditionally employed their antiarmor weapons in a piecemeal fashion, parcelling them out to rifle companies or teams who use them to defend other arms or a position. Normally, in an attack, antitank weapons are given to companies overwatching by bounds. However, the following are more effective ways to use TOWs:

- In the offense, the use of antiarmor systems greatly increases the maneuver commander's ability to overwatch his forces and to conduct an attack. Antiarmor fires also allow the commander to engage and destroy enemy tanks before committing his maneuver forces to the battle.
- In the defense, the integration of antiarmor fires with engineer countermobility efforts, artillery, and other direct-fire weapons increases the chance for success against a larger enemy force.

## 2. Organization and Characteristics.

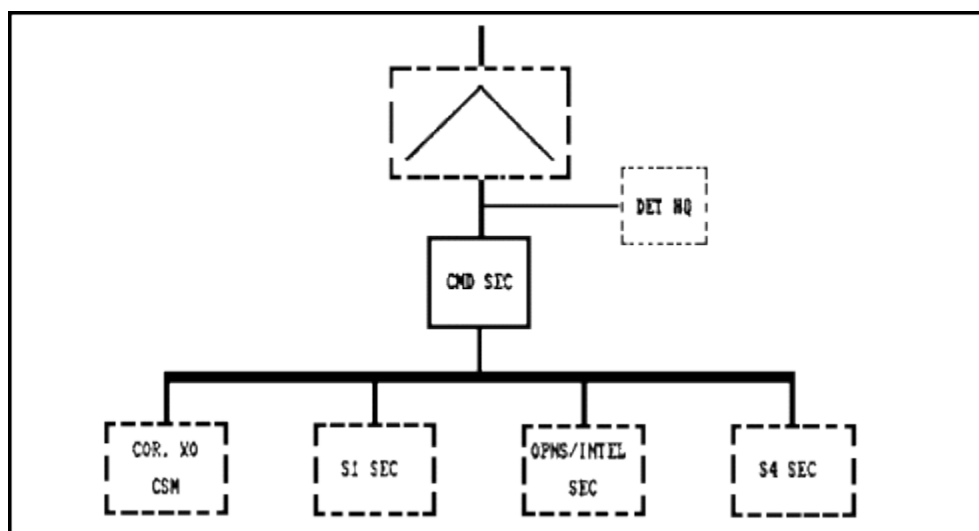
In response to the tank and the motorized threat of potential enemies, all light, mechanized, and infantry battalions are equipped with one or more antiarmor platoons or at least one antiarmor company. While these infantry antiarmor units differ in their organization and in some equipment, they all have TOW weapon systems. Antiarmor units are organized under both the H-edition and the L-edition Tables of Organization and Equipment (TOEs).

a. Infantry Battalion Antiarmor (Separate). Infantry Battalion Antiarmor (Separate). The separate antiarmor battalion has a headquarters detachment and five antiarmor companies with twelve M966-mounted (HMMWV) TOWs each, as shown in [Figure 1-1](#). Its headquarters is not staffed or equipped to function as a tactical control element. Instead, its companies are attached to maneuver units.



**Figure 1-1. Infantry Battalion Antiarmor (Separate).**

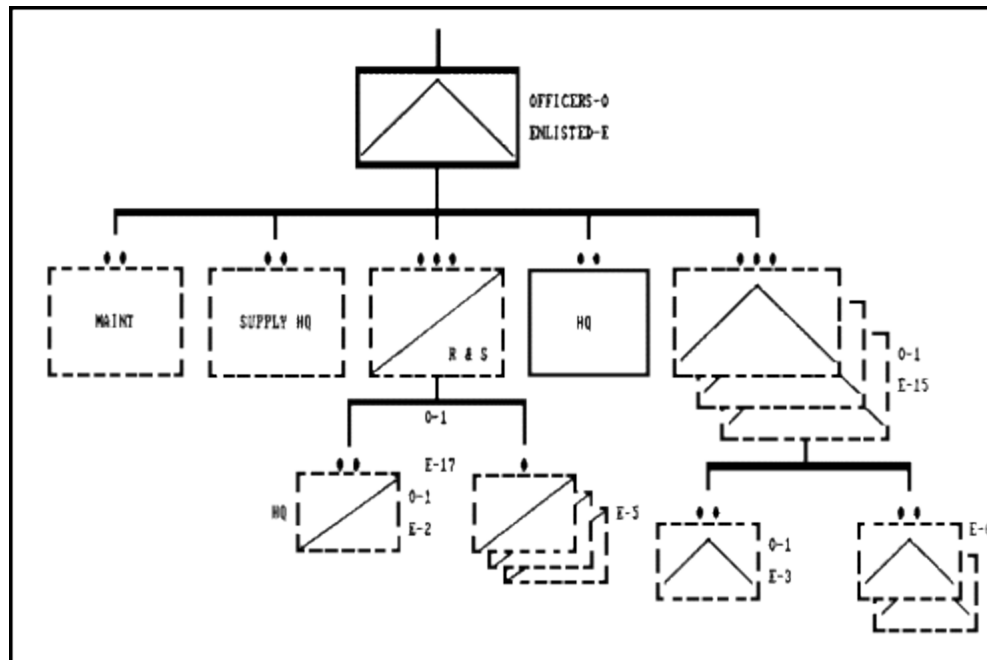
(1) Headquarters and Headquarters Detachment. The headquarters and headquarters detachment (HHD) manages the command, the staff planning, and the supervision of operations (other than the tactical employment) of the five organic antiarmor companies, as shown in [Figure 1-2](#). It has limited administrative, supply, food service, medical, and maintenance capabilities. The antiarmor battalion depends upon the supported division or brigade for its combat service support (CSS) in these areas.



**Figure 1-2. Headquarters and Headquarters Detachment, Infantry Battalion Antiarmor (Separate).**

(2) Antiarmor Company. Each antiarmor company has a headquarters and three organic antiarmor platoons, as shown in [Figure 1-3](#). The headquarters provides command and control for the tactical employment of the platoons.

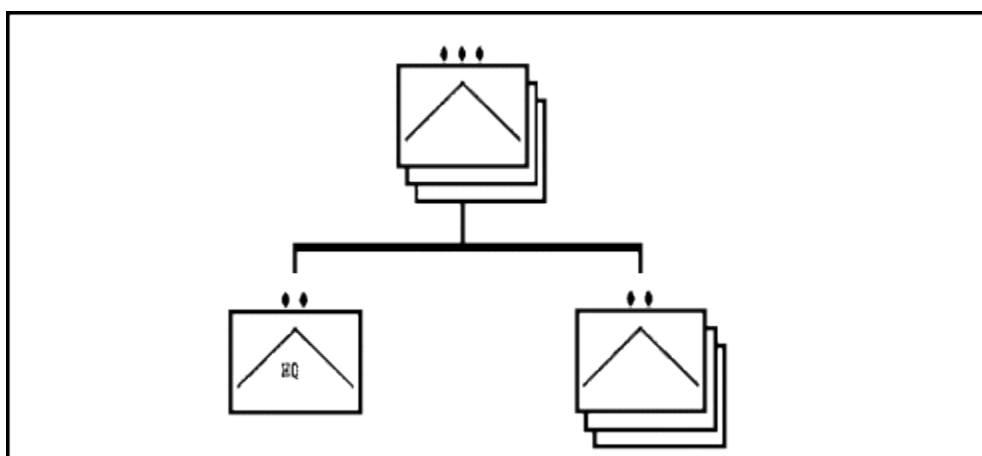
- Scout Platoon. The scout platoon reconnoiters TOW firing positions and routes between positions. It has three squads mounted in HMMWVs with M60 machine guns. The scout platoon also performs liaison.



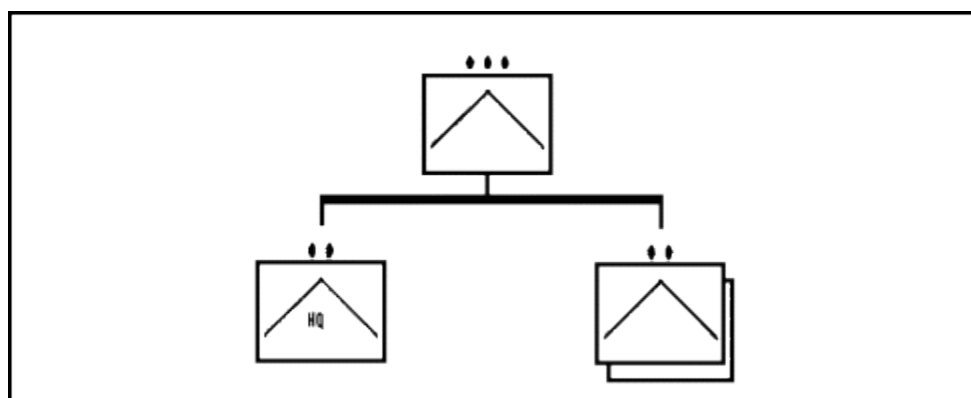
**Figure 1-3. Antiarmor Company, Infantry Battalion Antiarmor (Separate).**

- Supply Section. The supply section, in addition to fulfilling other supply needs, has two 5-ton trucks with 1 1/4-ton trailers and one 5-ton truck with a tank and pump unit. These are used to haul some of the company's ammunition and fuel.
  - Maintenance Section. The company's maintenance section provides limited automotive and communications equipment maintenance support along with its five-ton vehicle recovery capability. This section normally collocates with and augments the division or brigade maintenance support unit and helps repair vehicles and equipment. However, while the antiarmor company is attached to a division or a brigade, the company maintenance section is attached to that unit's direct support (DS) maintenance unit.
- b. Antiarmor Company and Mechanized Battalions (L-Edition). Infantry and mechanized battalions organized under the L-edition TOE have an organic antiarmor company. The infantry battalion (air assault and airborne) mechanized variations of this antiarmor company are shown in [Figures 1-4](#) and [1-5](#). In each of these companies, the headquarters controls the tactical employment of the platoons. The antiarmor company in an air assault or an airborne battalion has five platoons. The antiarmor companies depend upon their parent (infantry or mechanized) battalion for CS and CSS.





**Figure 1-6. Antiarmor Platoon, Infantry Battalion (H-Edition).**



**Figure 1-7. Antiarmor Platoon, Light Infantry Battalion.**

### 3. Antiarmor Capabilities and Limitations.

Antiarmor weapons have both common capabilities and certain limitations. Both these capabilities and limitations are discussed in the following paragraphs.

a. Capabilities. All antiarmor units have common capabilities that must be known and considered in order for the units to reach their combat potential. The TOW weapon system provides direct fire against armor and other hard targets, thus freeing friendly tanks for their more important roles of either exploiting successful attacks or counterattacking.

(1) Attack Role. In the attack, antiarmor units initially form the base of a supporting attack by fire to fix the enemy in position. As the attack progresses, the antiarmor unit displaces forward to fire into planned engagement areas. Their mission is to destroy enemy countering or withdrawing forces. The antiarmor unit is ideally suited for contingency flank protection missions. These missions block enemy counterattacks or set up the enemy for destruction by maneuver companies.

(2) Defensive Role. In the defense, the antiarmor unit can be positioned first on the leading edge of the defensive sector to aid in battle handover or to overwatch scouts or obstacles. As the enemy closes, the antiarmor unit displaces to positions that afford flank and rear shots into engagement areas. During the counterattack, the antiarmor unit



provides overwatch and support by fire. Light TOW units have HMMWVs equipped with the interchangeable mount system. This system provides TOW HMMWV units an expanded ability to conduct close combat in all environments. When the HMMWV is mounted with the MK 19 40-mm grenade machine gun or the M2 .50-caliber machine gun, the HMMWV can destroy light armor, infantry, and field fortifications. Both machine guns complement other weapons, especially the TOW.

b. Limitations. Antiarmor units also have the following limitations:

- Commanders employing wheeled vehicle-mounted (HMMWV) antiarmor units must consider the fact that these vehicles lack protection against direct and indirect fires. However, to improve their survivability, they can be positioned carefully in depth and can relocate rapidly.
- Both tracked and wheeled vehicle-mounted antiarmor elements must be positioned so that accompanying infantry can provide security against ground attacks, especially in restricted terrain and during reduced visibility. Although TOW missiles are accurate, their rate of fire is slow because of tracking and reload time. This fact, coupled with the TOW's launch signature, increases the antiarmor squad's vulnerability. This is especially true when the TOW is mounted upon a wheeled vehicle and engages a target within the enemy's direct-fire range. This vulnerability is reduced when antiarmor elements reposition often. It is further reduced when they integrate their fires with those of tanks and other antitank weapons and with indirect fires. This integrated fire complicates the enemy's target-acquisition task. However, the lack of a dedicated fire support team/forward observer (FIST/FO) for each antiarmor unit limits the potential of coordinated indirect and direct (antiarmor) fires.

#### 4. The Antiarmor Platoon.

The organization of the antiarmor platoon provides all soldiers with possible career progression and depth. Positions are available throughout the platoon for soldiers of all skill levels. Therefore, well-trained soldiers can fill vacancies resulting from personnel turnover, peacetime shortfalls, or combat losses.

Leaders ensure that their units can conduct sustained operations. To successfully fulfill their responsibilities, leaders must ensure that their men are tactically and technically proficient and that equipment is maintained. Leaders must ensure that their men receive proper care. In addition to providing food and supplying shelter, this also means preparing each soldier for combat. Based upon their unit mission, some leaders may have added responsibilities.

- a. Antiarmor Platoon Leader. The antiarmor platoon leader is responsible for the training, maintenance, and tactical employment of the platoon. His responsibilities are to plan, coordinate, and integrate the platoon's fires to fit the supported unit's tactical plan. He knows the capabilities of his antiarmor systems and is skilled in their use. The antiarmor platoon leader employs his platoon tactically based upon orders from the antiarmor company commander or the maneuver unit commander whom he is supporting. In light infantry battalions, he is the

main antiarmor advisor to the battalion commander. He recommends the best use of his platoon to support the tactical plan.

b. Antiarmor Platoon Sergeant. The antiarmor platoon sergeant leads elements of the platoon as directed by the platoon leader and assumes command of the platoon in the platoon leader's absence. He helps the platoon leader train the platoon and control it in tactical operations. He supervises the maintenance of equipment, supply, and other CSS matters.

c. Antiarmor Section Leader. The antiarmor section leader is responsible for the discipline and training of his two antiarmor squads and for the maintenance of their equipment. In combat, he selects the location of primary, alternate, and supplementary firing positions. He controls the section's fires and coordinates mutual support with tanks and infantry near his position.

#### 5. Infantry Battalion Antiarmor (Separate).

This paragraph discusses how the separate antiarmor battalion should be employed on the battlefield. The employment techniques concern the effective use of the antiarmor battalion units within the framework of combined arms and capabilities.

a. Functions. The separate antiarmor battalion provides heavy, reinforcing antitank fires to maneuver units, which are particularly critical for light infantry divisions if an enemy armor threat exists. It is a corps asset the subunits of which are usually attached to divisions or brigades, depending upon where they are needed most. A corps commander usually attaches the entire battalion to a division. The division commander may further attach the antiarmor companies to his maneuver brigades or battalions. The antiarmor companies are then employed by the units to which they are attached. The separate antiarmor battalion gives the supported maneuver commander flexibility. It is equipped with HMMWVs and can therefore move rapidly by road or cross-country to critical points on the battlefield.

b. Capabilities and Limitations. The antiarmor battalion has both capabilities and limitations, as discussed below.

(1) Capabilities. The antiarmor battalion provides heavy antitank fires on the battlefield. It is unique in organization and concept and can quickly deploy to many theaters to provide maneuver units with direct antiarmor fires. As with other TOW organizations, antiarmor battalion weapons systems provide high target-hit probability at long ranges.

(2) Limitations. The antiarmor battalion also has all the limitations inherent in the TOW system:

- Long flight.
- Large firing signature.
- Slow rate of fire.
- Requirement for a line-of-sight to the target.
- Antiarmor battalions lack armor protection because their weapons are mounted upon light wheeled vehicles. They are vulnerable to both direct and indirect fires.

This requires special consideration. Commanders must employ them initially from positions where indirect fires are unlikely, and then move them to avoid their engagement by indirect fires.

c. Command and Staff Relationships. The infantry battalion antiarmor (separate) differs greatly from other battalions in that it is not designed or equipped to conduct extended combat operations as a battalion. The command relationship between the companies of the antiarmor battalion and the maneuver units which they support is usually that of attachment because of the antiarmor battalion's limited CSS capability. This attachment makes the functions of the antiarmor battalion commander and his staff differ from those of his supported maneuver unit counterpart.

(1) Battalion Commander. Normally, the antiarmor battalion commander's subordinate units are attached to maneuver units. They respond to the maneuver unit's orders, plans, and support. Therefore, the antiarmor battalion commander rarely exercises command and control in a tactical situation. He advises the maneuver unit as to the employment of the antiarmor companies. He ensures that his soldiers are trained to their full potential, and he must understand the weapon system to ensure that it is properly employed. To ensure this, he supervises the coordination efforts of his staff so that services provided by the support unit are sufficient to accomplish the mission.

- When the battalion is ordered to move to a new area of combat, the battalion commander performs the following actions:
  - coordinates the detachment of his unit with his companies from the formerly supported units.
  - moves to the new area by road march.
  - coordinates with the newly supported unit commander.
- The battalion commander works with the supported unit's commander to integrate the antiarmor companies into the scheme of the maneuver and the fires.
- The battalion commander ensures the rapid, smooth transition of his companies from one unit of his attachment to another. To do so, he ensures that his companies know where to go and to whom to report and that they are informed of the new mission.

(2) Battalion Staff. The antiarmor battalion staff aids the commander in his advisory, support, and coordination efforts. The main function of the staff officers is to supervise the training, control, and administrative deployment of the subordinate units. Due to the antiarmor battalion's limited CSS assets and its resulting dependence upon the maneuver units for support, staff officers act as liaison officers. The staff's main limitation is its personnel shortage, which prevents it from conducting sustained combat operations.

(a) Staff Functions. The staff performs the following actions:

- Continuously plans for the detachment, consolidation, and attachment of the battalion or of any of the companies.
- It normally exercises its coordination and liaison function by working with the appropriate general staff member. This does not mean that the antiarmor battalion staff officers are added to the duty roster--they have specific functions. The general staff helps them accomplish their mission.

(b) Staff Officers. The staff consists of the following officers:

- Intelligence/Operations Officers (S2/S3). The S2/S3 is the senior staff member. He helps the commander ensure coordinated and complete staff actions. He may work with the battalion commander by advising and helping the supported commander employ the companies. In the commander's absence, he assumes control of the battalion. He also makes the initial coordination efforts for the movement of the battalion.
- Adjutant (S1). The S1 ensures that the administrative support for the battalion is coordinated with the maneuver unit. The battalion depends upon the supported maneuver unit for personnel, administrative, finance, chaplain, and medical support.
- Supply Officer (S4). The S4 for the battalion coordinates maintenance, ammunition resupply, food service, and other supply requirements for the antiarmor battalion.

d. Employment Guidelines. Employment guidelines exist for task organizing with the separate antiarmor battalion. The corps commander directs the attachment of the battalion to reinforce the division (or divisions) on the corps' main armor avenues of approach. Ideally, the whole battalion is attached to a division. The battalion can then be suballocated; its companies can be attached to any size unit from brigades down to battalion task forces. However, the antiarmor companies are best employed as a whole because they offer massive, coordinated antiarmor firepower under one commander. A separate antiarmor company is organized as follows:

(1) Company. The company has headquarters, maintenance, communications, and supply sections, as well as a reconnaissance and security platoon. The company headquarters section commands and controls the tactical deployment of the three organic platoons. It has an executive officer (XO), first sergeant, communications chief, and radiotelephone operator (RATELO) to help the company commander perform his mission.

(2) Reconnaissance and Security Platoon. The reconnaissance and security platoon has three squads. Each squad is equipped with two HMMWVs. Each HMMWV is equipped with a pedestal-mounted M60 machine gun and radios. The reconnaissance and security platoon headquarters also has one HMMWV for command and control. The reconnaissance and security platoon reconnoiters routes to primary, alternate, and

supplementary TOW firing positions. It also maintains liaison with supported and adjacent unit commanders.

(3) Supply Section. The supply section has one supply sergeant, one armorer, and two ammunition specialists. This section uses two 5-ton trucks with 1 1/4-ton trailers for ammunition resupply and one 5-ton truck petroleum, oils, and lubricants (POL) resupply. Because the antiarmor company may be employed over a large area, the commander (aided by the S4) must coordinate for other resupply requirements.

(4) Maintenance Section. The maintenance section provides wheeled-vehicle mechanics and one signal equipment mechanic for unit maintenance support. However, the antiarmor company depends entirely upon division support command (DISCOM) or corps support command (COSCOM) for all wire-guided missile maintenance and support.

e. Coordination with Supported Units. The separate antiarmor battalion is employed only in attachment. This means that the unit to which antiarmor battalion units are attached is responsible for command and control, administration, and logistics support. The antiarmor battalion depends upon the unit to which it is attached for all ammunition, POL, repair parts, rations, medical treatment, replacement personnel, and pay.

(1) Antiarmor Unit Leader's Responsibilities. All antiarmor battalion unit leaders must coordinate continuously with the leaders of the supported unit to ensure the proper employment and resupply. The antiarmor unit leader must discuss

- his unit's capabilities and limitations.
- recommendations for integrating his TOW assets into the overall antiarmor system in defensive, offensive, and retrograde operations.
- resupply, including ammunition, POL, and rations.
- maintenance and administration.

(2) Subunit Supervision. As tactical operations progress and antiarmor battalion units are moved about the battlefield from one maneuver unit to another, the battalion staff, company commanders, executive officers, and platoon leaders must oversee their subunits at all times.

f. Combat Service Support. The infantry battalion antiarmor (separate) is not designed or equipped to conduct extended combat operations alone. The battalion companies are detached from the battalion and attached to other units (division, brigade, or battalion) for combat operations. When attached to maneuver units, the companies depend mainly upon the supported unit for CSS.

(1) Maintenance. The companies of the separate antiarmor battalions can perform unit maintenance for wheeled vehicles and signal equipment. Vehicle maintenance is limited to the use of the light mechanics tool kit. Maintenance requirements beyond the capability of company personnel become the responsibility of the maneuver unit.

- (2) Evacuation of Disabled Vehicles or Equipment. Disabled vehicles or equipment that cannot be repaired by the operator or the company maintenance personnel is evacuated by the supported unit to its UMCP. If the item cannot be repaired at the battalion level, the supported unit evacuates it to the next level of maintenance support.
- (3) Weapons. Unit maintenance of weapons is accomplished by operators and crew by armorers from the supported battalion. If this is not possible, the supported battalion evacuates the weapon to the next level of maintenance support. Wire-guided missile maintenance support is provided by maintenance units in the appropriate DISCOM or COSCOM.
- (4) Rations. Rations and water are supplied by the supported unit. The antiarmor companies cannot prepare their own rations.
- (5) Petroleum, Oils, and Lubricants (POL). Each antiarmor company has one 5-ton POL truck.
- (6) Ammunition. Each company has two 5-ton trucks for ammunition resupply. The company must operate within the supported unit's ammunition resupply system. This means that the company obtains its missiles and other ammunition from the same source as the supported unit.
- (7) Repair Parts. Repair parts are obtained through the supported unit.

## 6. Antiarmor Company.

The antiarmor company commander personally leads his company and also leads through his executive officer, first sergeant, platoon leaders, and other subordinate leaders. He employs his company in combat based upon orders from higher headquarters and on his mission, enemy, terrain, troops, and time (METT-T) analysis. In the absence of orders, he bases his actions upon an understanding of the battalion mission and upon the commander's concept of the operation. This paragraph discusses the employment of the antiarmor company in mechanized infantry, airborne, and air assault divisions in the infantry antiarmor (separate) battalions.

Each commander must be an example of competence and professionalism. The commander must prepare his unit to fight and know how best to use the TOW in combat. He must also know the abilities and limitations of his company's equipment and how to employ equipment to the best advantage.

- a. Definitions. Command is the ability to direct and give orders. A company commander has authority over all elements of organic, assigned, and attached to his company. Command and control is the process by which a commander uses his authority to accomplish the mission; it consists of the formulation and execution of orders and the physical facilities used to transmit those orders. The system of command and control used by each commander depends upon the organization, the facilities available, and the personality of the commander. The unit SOP should explain this system so that incoming personnel and those working with the unit are quickly integrated into the company command structure. As new equipment arrives and commanders change, the unit SOP may change.

b. Responsibilities. The company commander must outline in the SOP the responsibilities of the following officers:

- Executive officer.
- Fire support officer (when provided).
- First sergeant.
- Nuclear, biological, and chemical noncommissioned officer.
- Communications chief.
- Supply sergeant.
- Armorer.
- Platoon/section leaders.

(1) Executive Officer. The executive officer is the second in command. He takes charge of the most important area of the most important area or function on the battlefield as determined by the commander. He sends routine battle reports to the battalion main command post (CP). Before the battle, he coordinates with battalion for CS actions and coordinates the first sergeant's execution of CSS. He keeps abreast of the tactical situation and is prepared to take command. The executive officer operates well forward in his assigned vehicle. He seldom engages in the actual fight but communicates with the battalion and with lateral units. The commander leads the company in battle while the executive officer reports to the battalion main CP. The executive officer acts as a relay to the company commander when the battalion commander is out of communications range.

(2) Fire Support Officer. If provided, the fire support officer develops a fire support plan that complements the tactical plan. He forwards the company planning requirements to the fire support element (FSE) at the battalion main command post (CP). He rides in his fighting vehicle system (FVS) and calls for and adjusts fires as directed by the company commander and the battalion fire support officer (FSO). He coordinates with the tactical air control party (TACP).

(3) First Sergeant. As the senior noncommissioned officer in the company, the first sergeant advises the commander concerning enlisted matters. He helps the commander by performing the following actions:

- Supervises the administration of the company.
- Performs precombat inspections.
- Coordinates CSS matters with the battalion S4, S1, and BMO.
- Acts as CSS operator.

- Receives CSS reports from platoon sergeants, provides CSS information to the executive officer, and helps the executive officer prepare CSS.
- Coordinates maintenance.
- Coordinates training activities.
- Coordinates with platoon sergeants and the executive officer for requirements.
- Dispatches maintenance and medical personnel.
- Renders reports.
- Submits requests to the combat trains CP.
- Executes CSS company-wide.
- Supervises company trains.

(4) Nuclear, Biological, and Chemical Noncommissioned Officer. The nuclear, biological, and chemical noncommissioned officer performs the following actions:

- Helps the commander plan and conduct NBC operations.
- Advises the commander concerning organizing and training the unit's NBC teams.
- Supervises maintaining and employing the company's NBC equipment.
- Relays NBC reports between the company and the battalion or through the executive officer.
- Advises the commander concerning areas of contamination.
- Maintains the radiation status chart.
- Operates forward with the executive officer but may operate from the company combat trains.

(5) Communication Chief. The tactical communications chief coordinates the activities of his section to accomplish the commander's orders and to support the commander's maneuver plan. The commander and the communications chief are responsible for training personnel in communications procedures and equipment maintenance.

(6) Supply Sergeant. The supply sergeant requests, receives, issues, stores, maintains, prepares, and turns in supplies and equipment for the company. He is in charge of the company assets in the battalion field trains. There, he is under battalion supervision, where he is supervised by the headquarters and headquarters company (HHC) commander.

(7) Armorer. The armorer's primary duty is to repair the small-arms weapons of the company. He sends weapons to DS maintenance. He should work forward to repair the company's small-arms weapons.



(8) Platoon/Section Leaders. The platoon leaders and leaders of attached CS elements are responsible for the training, tactical employment, and logistics of their platoons. The platoon leaders must know their weapon systems and abilities and how to employ them for the best effect.

c. Organization, Positions, and Special Missions. Command and control of the antiarmor company is exercised by the maneuver battalion commander through the company commander. The antiarmor company is the battalion commander's means to influence the battle without having to use tanks or infantry in a primarily antitank role. The antiarmor company frees both tanks and infantry from antitank missions and allows them to be used to their best advantage. The company commander gives the battalion commander a single point of contact for controlling his massed antiarmor fires.

d. Task Organization. Task organization refers to how available assets are distributed to a mission. It is based upon the battalion commander's analysis of METT-T and upon his chosen course of action. The preferred choice is to leave the company intact under the control of its commander. However, sometimes one or more of the platoons must be task organized to other companies. These options are as follows:

(1) Company. The company may be employed as organized, without modification.

(2) Platoon. One or more of the company's platoons may be attached to or placed under operational control (OPCON) to the battalion's rifle companies.

(3) Antiarmor and Maneuver Platoon Mix. A mix of antiarmor platoons and maneuver platoons can be organized under the antiarmor company headquarters as a maneuver unit. This is done when extra flank security or a strong battalion security/counterreconnaissance force is needed. The antiarmor company has limited mess, supply, and recovery support. It also has no FIST. When a maneuver headquarters is formed, solutions for each of these limitations must be found.

(4) Company Elements. Elements of the company may be attached to an armor battalion. This occurs only in defensive situations where TOW vehicles and tanks are positioned to bring the most effective combined fires on the enemy.

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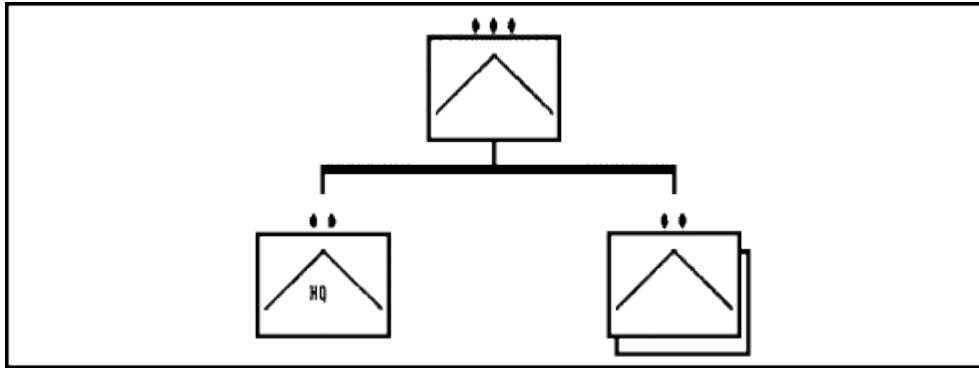
## LESSON 1

### PRACTICE EXERCISE

**Instructions** The following items will test your knowledge of the material covered in this lesson. There is only one correct answer for each item. When you complete the exercise, check your answers with the answer key. If you answer any items incorrectly, go back to the part of the lesson that contains the information involved and study again.

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**Situation:** You are the leader of the antiarmor organization shown in [Figure 1-8](#). Use this situation and [Figure 1-8](#) to answer questions 1 through 3.



**Figure 1-8. Antiarmor Organization.**

1. You command which of the following antiarmor organizations?
  - ☐ A. Infantry battalion antiarmor (separate).
  - B. Headquarters and headquarters detachment, infantry battalion antiarmor (separate).
  - C. Antiarmor company, air assault, and airborne battalion.
  - D. Antiarmor platoon, light infantry battalion.
2. You command how many sections?
  - A. Two.
  - B. Four.
  - C. Six.
  - D. Eight.

3. Your organization has how many TOW systems?

- A. Two.
- B. Four.
- C. Six.
- D. Eight.

Situation: You are the commander of an antiarmor company. Use this situation to answer questions 4 and 5.

4. During combat, you rely upon which of your subordinates to send routine battle reports to the battalion main command post (CP)?

- A. Executive officer.
- B. Fire support officer.
- C. First sergeant.
- D. Communications chief.

5. Upon which of your subordinates do you rely for the coordination of maintenance?

- A. Executive officer.
  - B. Fire support officer.
  - C. First sergeant.
  - D. Communications chief.
-

## LESSON TWO

### TARGET IDENTIFICATION AND ENGAGEMENTS AND PLANNING AND PREPARATION FOR OFFENSIVE AND DEFENSIVE OPERATIONS

#### OVERVIEW

##### **TASK DESCRIPTION:**

In this lesson, you will learn to identify and engage targets and to plan and prepare for offensive and defensive operations.

##### **LEARNING OBJECTIVE:**

- TASKS:** Identify and engage targets and plan and prepare for offensive and defensive operations.
- CONDITIONS:** You will be given access to information from FM 7-1.
- STANDARDS:** Identify and engage targets and plan and prepare for offensive and defensive operations in accordance with [FM 7-91](#).
- REFERENCES:** The material contained in this lesson was derived from the following publication:

[FM 7-91](#)

#### INTRODUCTION

Antiarmor units encounter a variety of targets. They must be able to identify and engage these targets in an effective manner. Targets are identified by the use of methods of observation and the discernment of target signatures. Targets are engaged by estimating range, and employing fire control methods and principles of fire control. Offensive operations are based upon concentration of fire, surprise, speed, flexibility, and audacity, and are planned using a scheme of maneuver; a fire support plan and other planning considerations; a mission, enemy, terrain and weather, troops, and time available (METT-T) analysis; operational security measures; and control measures. Successful defensive operations have certain characteristics; are planned according to certain considerations, including a METT-T analysis control measures; and security procedures, and are executed according to certain guidelines. This lesson will teach you how to identify and engage targets and how to plan and prepare for both defensive and offensive operations.

#### PART A - TARGET IDENTIFICATION AND ENGAGEMENT

##### 1. Engagement Priorities.

Usually, targets that appear in armor formations vary; for example, the following are such targets:

- Tanks.
- Armored personnel carriers.
- Air defense weapons.
- Artillery.

Fires from platoons can be rapidly and effectively distributed by assigning each platoon a particular type of target to engage first.

## 2. Primary Targets.

The primary targets for antiarmor platoons are armored vehicles. Squad members should look for terrain where armored vehicles are most likely to appear. Knowing Threat armor tactics and the characteristics of Threat vehicles can help squad members recognize terrain where these vehicles will most likely be employed.

a. Threat Tactics. Threat tactics stress the use of speed and firepower to overwhelm and destroy an opposing force. Threat doctrine directs an average daily rate of advance of 40 to 50 kilometers under conventional conditions and 30 to 50 kilometers under normal conditions. To do this, armored vehicles require enough ground for rapid movement and adequate space to maneuver and fire. High speed avenues of approach, such as roads, ridges, and flat, rolling terrain, should be constantly observed. An initial rally point (IRP) is useful to pinpoint these areas to evaluate terrain from the Threat's viewpoint. The questions to be answered by the IRP are:

- How can the enemy use the terrain?
- Where is the enemy likely to appear first?

b. Terrain. Terrain is constantly changing because areas are cleared for farming and new roads and buildings are constructed. Since weather influences the effects of terrain, ground reconnaissance is needed. It obtains current, detailed information about roads, trails, man-made objects, the density of trees and brush, and the seasonal condition of streams and rivers. If a ground reconnaissance is not possible, an aerial reconnaissance should be used.

c. Mobility Characteristics. Knowing the mobility characteristics of the Threat armored vehicles also helps antiarmor platoons determine where to look. If the situation permits, tank and motorized units should avoid terrain or obstacles that can stop or impede movement such as the following:

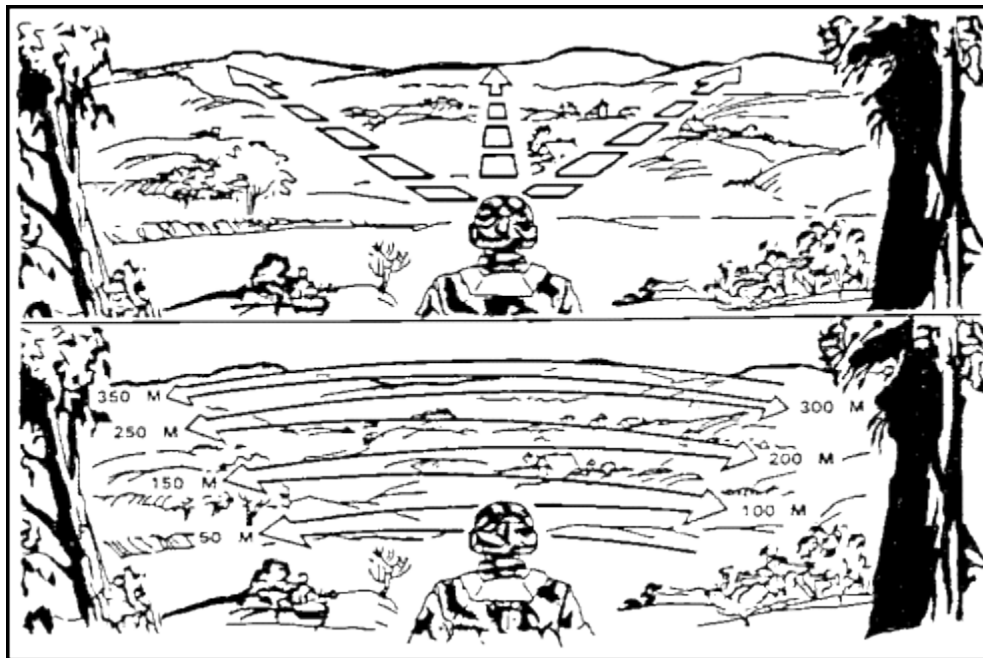
- Slopes steeper than 30 degrees.
- Sturdy walls or embankments three feet high or higher.
- Ditches or gullies nine feet wide or wider and three feet deep or deeper.
- Hardwood trees 10 inches or larger in diameter and 10 feet or fewer apart.
- Water obstacles at least five feet deep. (Warsaw Pact tanks are equipped with snorkels, but they are time consuming to install).
- Swampy terrain or rough, rocky terrain.
- Built-up areas in which vehicles are restricted to movement on confined roads, through park areas, or across sports fields.

Armored vehicles can breach some obstacles and can move through restrictive terrain, but these factors greatly slow their terrain. Therefore, a commander may continue to observe those areas and move TOWs only to react to Threat initiatives from those areas.

### 3. Methods of Observation.

The observation of likely armor approaches must be continuous, even when the unit is moving.

- a. Sectors of Observation. The TOW squad leader assigns areas of responsibility to the squad members to ensure that the entire sector (assigned by the section leader) is covered. TOW gunners use their TOW sights to observe their sectors from the maximum engagement line back about 2,500 meters. The squad leaders use binoculars to observe from 2,500 meters back to about 1,000 meters. The drivers are responsible for local security and for observing the area from 1,000 meters back to the TOW position. The exact distance that each squad member is responsible for depends upon the terrain and is normally keyed to easily recognizable terrain. Sectors of observation should be rotated routinely so that personnel do not become fixated.
- b. Scanning. Proper scanning methods (as shown in [Figure 2-1](#)) allow TOW squads to locate and identify targets quickly. With the naked eye, observers should first make a quick overall search for obvious targets or signatures such as exhaust smoke or dust. They should also listen for sounds such as engine noises. If possible, observers should turn off their engines so that the sounds of enemy vehicles can be heard.



**Figure 2-1. Proper Scanning Techniques.**

Observers should stop their scanning often and focus on a distant object, such as a terrain feature or a man-made structure. Otherwise, their eyes relax and distant objects become blurred. They should routinely scan the sector without optics and then focus on a distant object.

If a target is detected, it should be observed until it is engaged. Otherwise, it may be difficult to find again. If observers must look away, they should note the target's direction of travel relative to a prominent terrain feature. The terrain feature is then used as a release point (RP) in finding the target again.

During darkness, observers should look a few degrees off to the side of an object rather than directly at it. At night, the sides of the eyes are more sensitive to dim light. Also, the eyes should be moved in short, abrupt, irregular movements. Observers should pause a few seconds at each likely target area and look for movement, a light source, or any other target signature.

c. Optics. Using the TOW sights (both optical and night), squad leader's periscope, binoculars, and night observation devices, gunners can acquire targets at ranges greater than with the naked eye. Thermal night vision sights and devices can also be used both day and night to acquire targets through smoke, light vegetation, camouflage, and fog.

Because the TOW sights have limited fields of vision, observers must scan slowly across their sectors to avoid missing targets or target signatures--for example, the field of vision for a TOW optical sight at 3,000 meters is limited to an area less than 300 meters wide; the field of view of a night sight at 3,000 meters is 360 meters. However, the field of vision with the naked eye is much wider. This means that with a TOW optical sight, a much narrower field of the sector can be viewed at one time.

The TOW 2 night sight can be used 24 hours per day. The thermal sight reads heat sources to detect targets even in daylight. However, observers using night sights tire quickly and must rotate often when they are scanning their sectors. When dismounted, soldiers scanning with the night sight are limited by the amount of operational time available from the night sight's batteries. This time can be increased by alternating observation periods between crewmen of squads covering the same sector.

The efficiency of binoculars in daylight can be increased by using only one eyepiece or by cupping the eyepiece with the hand to prevent more light from entering the eye. Keeping the binoculars steady by resting them against a steady object also increases efficiency.

An observer with binoculars and a means to communicate with the squad that is operating dismounted can often cover a sector better than a soldier with a night sight. This may be required when the vehicle is in a hidden position.

#### 4. Sources of Target Information.

Forward observers and tank, scout, and rifle platoons can be valuable sources of target information:

- Because the TOW platoon may be positioned in greater depth relative to the enemy avenue of approach, forward combat elements may be able to detect approaching armor before TOW platoon personnel. This is true most often when visibility is limited. The target information gained by forward combat elements is then passed to the TOW platoon leader.
- Antiarmor platoons may receive additional target information from ground surveillance radar (GSR) and Remotely Monitored Battlefield Sensor Systems (REMBASSs). Like TOW, GSR is

a line-of-sight (LOS) system. It can locate targets at long range (10,000 meters) during all visibility conditions. The REMBASS has sensors that are often emplaced near avenues of approach to detect movement of soldiers or vehicles. Both systems are excellent for use during limited visibility. They are often attached to battalions for early warning. Examples of target information that can be provided by REMBASS and GSR are the following:

- Location.
  - Direction of movement.
  - Classification of target (personnel, tracked or wheeled vehicle).
  - Rate of speed.
- Coordination must be conducted with units obtaining target information and should include at least the following:
    - Sectors of responsibility.
    - Radio frequencies and call signs.
    - Locations of primary and alternate positions.
    - Fire control measures to assist in the transfer of target information.

#### 5. Target Signatures.

Most weapons and vehicles have definite signatures. Vehicles using diesel fuel emit a lot of smoke, and most modern tracked vehicles use diesel fuel. Also, tracked vehicles make more noise than wheeled vehicles. Different makes of the same type of weapon, such as machine guns, often make distinctive sounds that identify them when fired. Antiarmor squads can use these different signatures to help locate and identify targets. Target signatures are detected mainly by sight, hearing, and sometimes smell. Anything strange or unusual should be thoroughly checked. Soldiers should watch for oddly shaped objects. A straightedge or even a curve may be an enemy vehicle or an enemy soldier. A sun reflection off a flat surface, such as a windshield, is an obvious disclosure. Knowing where a certain type of target is most likely to appear helps identify it once the signature is detected.

a. Signatures Indicating Soldiers' Presence. Signatures that indicate the presence of soldiers can include the following:

- Fighting positions.
- Trash.
- Cut or missing vegetation (cleared for fields of fire or camouflage).
- Freshly dug earth, indicating fighting positions.
- Voices.
- Light from matches, cigarettes, or fires.



b. Signatures Indicating Tracked Vehicles' Presence. Signatures that indicate the presence of tracked vehicles include the following:

- Large dust clouds.
- Diesel smoke.
- Noise from vehicle's engine.
- Vehicle tracks on the ground.
- Distinctive silhouettes or shapes.

c. Signatures Indicating Antitank Weapons' Presence. Signatures that indicate the presence of antitank weapons include the following:

- Smoke and flash of missile launch.
- "Swish" of missile launch.
- Long, thin wires in brush, trees, or along the ground.
- Traces of slow-flying antitank guided missiles (ATGMs).
- Dismounted soldier looking through a periscope-type device (the launcher could be up to 80 meters from the gunner).

d. Signatures Indicating Obstacles' and Mines' Presence. Signatures that indicate the presence of obstacles and mines include the following:

- Loose or disturbed dirt in a regular pattern
- Areas where large trees have been removed.

## 6. Target Identification.

All TOW gunners must spot targets and identify them as friendly or enemy targets. One way to do this is to know where friendly forces are located and where enemy vehicles are expected. All vehicles to be identified should be tracked until identified. Leaders must keep TOW gunners informed of the tactical situation and the location of friendly units.

a. Target Recognition by Type. Learning to recognize targets by type is not difficult, but identifying them as friendly or enemy requires study and attention to detail. This is especially true of tanks because friendly and Threat tanks are similar in design. Side by side, tanks may look different, but when they are camouflaged at a distance, their differences are hard to notice. Antiarmor squads must know what friendly and Threat armored vehicles they can expect to see on the battlefield. Training aids, such as graphic training aid 17-3-13 (GTA 17-2-13), 35-mm color slides, scale models, or pictures from magazines and newspapers, can be used to study the armored vehicles of various nations.

b. Differences Among Armored Personnel Carriers. Several obvious differences exist among armored personnel carriers. Because observers can seldom see an entire armored personnel

carrier, they should know the different structural characteristics of enemy and friendly vehicles. Four structural areas, common to all tanks, can be used to identify each type:

- Suspension system.
- Turret.
- Main gun.
- Commander's station.

c. Tank Recognition Features. The type, location, and absence or presence of certain equipment within the four areas (suspension system, turret, main gun, and commander's station) can identify any tank in the world. If any two of the areas can be identified, usually this is the tank. This is true even of a tank in the hull-down position because three of the four areas--turret, main gun, and commander's station--can still normally be seen, even with the thermal sight.

(1) Suspension System. This is the least reliable area for identification because it is often concealed by vegetation or terrain. The main suspension features that distinguish tanks include the following:

- Road wheels and support rollers.
- Road wheels only.
- Number of road wheels.
- Spacing between road wheels.
- Armored skirt.

(2) Turret. Characteristics of the turret that can be used to distinguish tanks include the following:

- Position of turret on hull--well forward, in the center, or to the rear.
- Shape of turret--rounded, elongated, or boxy.
- Externally mounted storage racks and other equipment.
- Application of reactive armor.

(3) Main Gun. The tank's main gun can be identified by the following characteristics:

- Presence and location along the gun tube of a bore evacuator.
- Presence of a muzzle brake or a blast detector.
- Presence or absence of a thermal jacket.

(4) Commander's Station. The commander's station can be a hatch or a cupola on the left or the right side. (A cupola is a small, turret-like projection on the top of the turret).

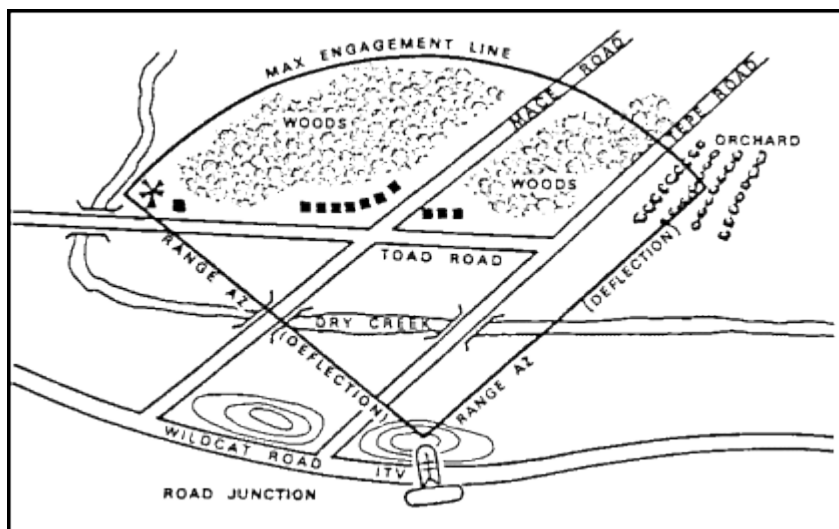
## 7. Target Engagement.

Before gunners fire TOW missiles at a target, they must determine whether the target can be engaged. A target can be engaged when it is within range of the missile, when it is exposed so that it can be identified and tracked, and when it is exposed long enough for the missile to reach the target. Target engagement is also affected by water obstacles and such firing limitations as power lines, smoke, fog, snow, and ground clearance. This paragraph provides TOW squads with techniques to rapidly determine target engagement.

a. Range Estimation. TOW gunners need not know the exact range to engage targets before engaging them. They need only know when targets are within range. Using a maximum engagement line speeds this determination. A TOW maximum engagement line (shown in [Figure 2-2](#)) is an imaginary line drawn across a sector of fire 3,750 meters from a TOW firing position. To establish this line, the squad leader or the gunner identifies the terrain features at or near his maximum range. Any target crossing or appearing short of this line should be within range. Established soon after a firing position is occupied, the maximum engagement line greatly reduces target engagement times, especially for targets that seem to be near maximum range. Several range determination techniques can be used to determine a maximum range line or the range to specific targets.

(1) Map and Terrain Association Method. The maximum engagement line can be easily determined from a map. To do this, follow these steps:

- Draw an arc on the map across the assigned sector of fire 3,750 meters from each firing position.
- Examine the map to identify distinctive natural or man-made terrain features that the line touches.



**Figure 2-2. Maximum Engagement Line.**

- Study the terrain in the sector of fire using binoculars or the TOW optical sight until all the selected terrain features are located. Those features are connected by an imaginary line from the maximum engagement line.

(2) Laser Range-Finding Method. Tanks and FIST have laser rangefinders. Also, GSR can be used to determine ranges out to 10,000 meters. Since these devices are seldom on the TOW position, the maximum engagement line must be adjusted right or left and forward or backward to compensate for separation from the TOW.

(3) Recognition Method. Range determination by recognition is simple and accurate. The soldier looks at the target with the naked eye, sights through the 7-power binoculars, or uses a TOW optical sight. The targets listed in [Figure 2-3](#) are recognizable out to the ranges indicated. For example, if a target can be recognized with the naked eye as an armored vehicle or a wheeled vehicle, it is within 2,000 meters. When using this method, terrain, visibility conditions, and target size must be considered. Some light and terrain conditions can make a target appear closer; other conditions can make it seem farther away. [Figure 2-4](#) lists some conditions that can have an influence on the apparent range of a target.

<u>Targets</u>	<u>Meters</u>	
	<u>Naked Eye</u>	<u>7-Power Magnification</u>
Tank crew members	500	2,000
Soldiers, machine gun, mortar	500	2,000
Antitank gun, antitank missile launchers	500	2,000
Tank, armored personnel carrier, truck (by model)	1,000	4,000
Tank, howitzer, APC, truck	1,500	5,000
Armored vehicle, wheeled vehicle	2,000	6,000

**Figure 2-3. Range Determination Recognition Method.**

<u>Seems Closer</u>	<u>Seems Farther</u>
Bright, clear day	Fog, rain, hazy twilight
Sun in front of targets	Sun behind targets
Higher elevations	Lower elevations
Bright or contrasting colors (white, red, yellow) contrast	Dark colors
Looking across ravines, hollows, rivers, and depressions	Camouflaged targets
At sea	

**Figure 2-4. Conditions Affecting Range Estimation.**

(4) Binocular Method. The reticle in standard binoculars can be used quickly to determine whether an armored vehicle is within TOW range.

## 8. Target Exposure Time Estimation.

Threat soldiers, like US soldiers, are taught terrain driving techniques that reduce the exposure time of their vehicles. TOW gunners must know how to estimate whether a target will be exposed long enough to engage it. The following techniques, although not exact, can increase the number of missiles that reach their targets before the targets find cover.

- The gunner can use the TOW night sight and 13-pound TOW optical sight to estimate whether a moving target can be engaged. Although this is only an estimate, it is useful when a target suddenly appears in an area that has not been recommended.
- The gunner can also use the reticle in the binoculars like the TOW optical sight to estimate whether a moving target can be engaged.

## 9. Engagement Limitations.

Several conditions may limit whether the TOW can be fired. These conditions include firing over water, over electrical power lines, through fires, and from buildings, and ensuring adequate ground clearance.

## 10. Fire Control and Distribution.

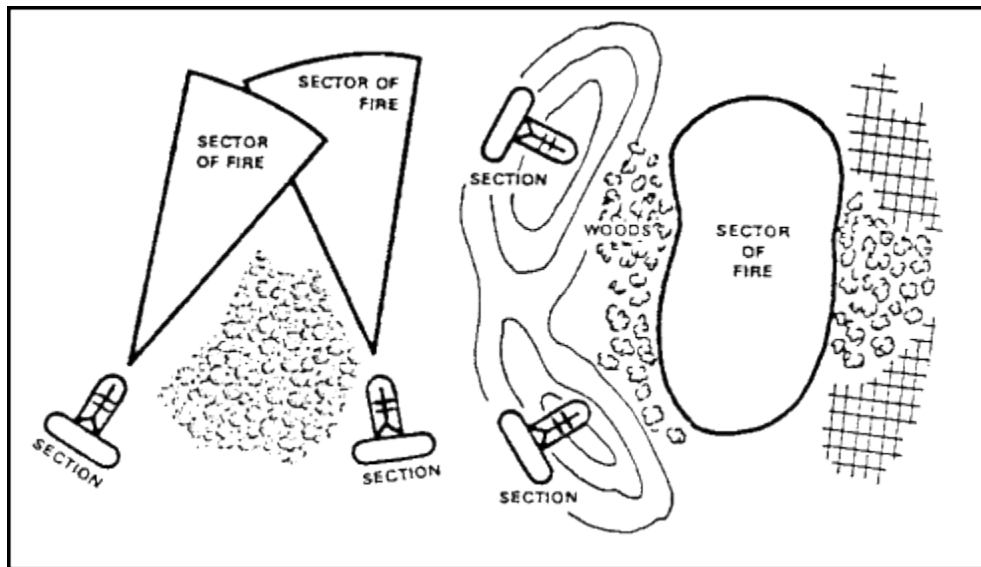
The success of antiarmor platoons in combat depends upon how quickly and effectively platoons engage targets. All TOW fires must be controlled to ensure the full coverage of the target area and to prevent multiple engagements of a single target. This paragraph discusses standard techniques for platoon and section leaders to control and distribute fires in combat.

a. Fire Control Methods. Fire control and distribution measures must be simple--leaders must know them well. Leaders must use these measures routinely, with no need for detailed instructions. The following are the commonly used measures for controlling the fires of an antiarmor platoon:

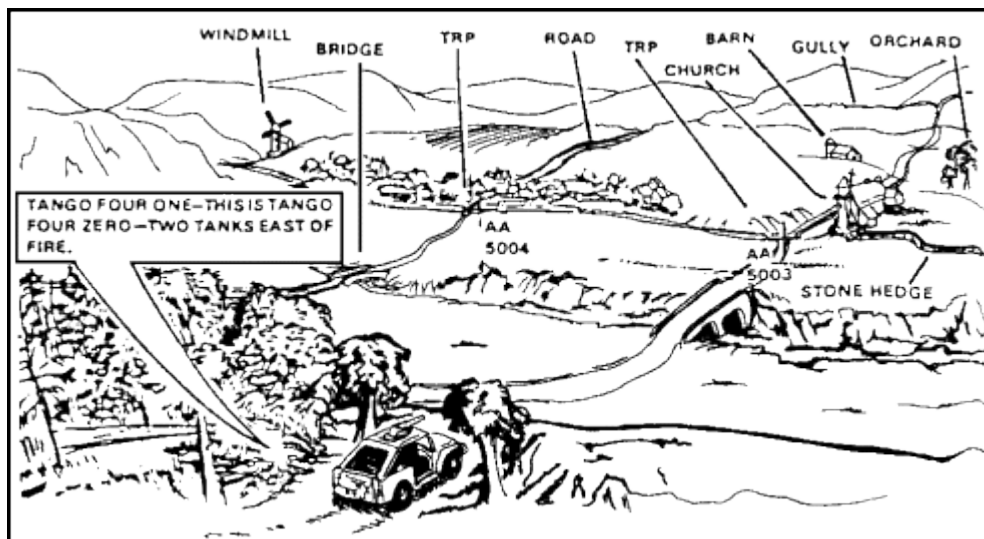
(1) Sectors of Fire and Fire Engagement Areas. Sectors of fire and fire engagement areas are specific areas to be covered. They are assigned to each squad, section, and platoon. They clearly identify the part of the battlefield that must be covered by observation and fire. In most situations, the terrain and the number and type of weapons available to cover an area dictate how sectors of fire or engagement areas are assigned.

(a) Sectors of Fire. A sector of fire (shown in [Figure 2-5](#)) is designated by its left and right limits. The limits of the sector can be defined easily by recognizable terrain features, such as roads, streams, hills, or woodlines. Sectors of fire usually extend from firing positions to the TOW's maximum engagement range. They should be assigned so that each area is fully covered with the correct type of fire. Also, mutual support is maintained between squads and between sections. It can be improved by assigning primary and secondary sectors of fire, as shown in [Figure 2-6](#). That is, to improve mutual support, one sector's secondary sectors of fire should correspond to another section's primary sector of fire. When no targets are in the primary sector, fire is shifted to the secondary sector upon order.

It can also be shifted to cover another TOW section if that section must be moved to an alternate position.



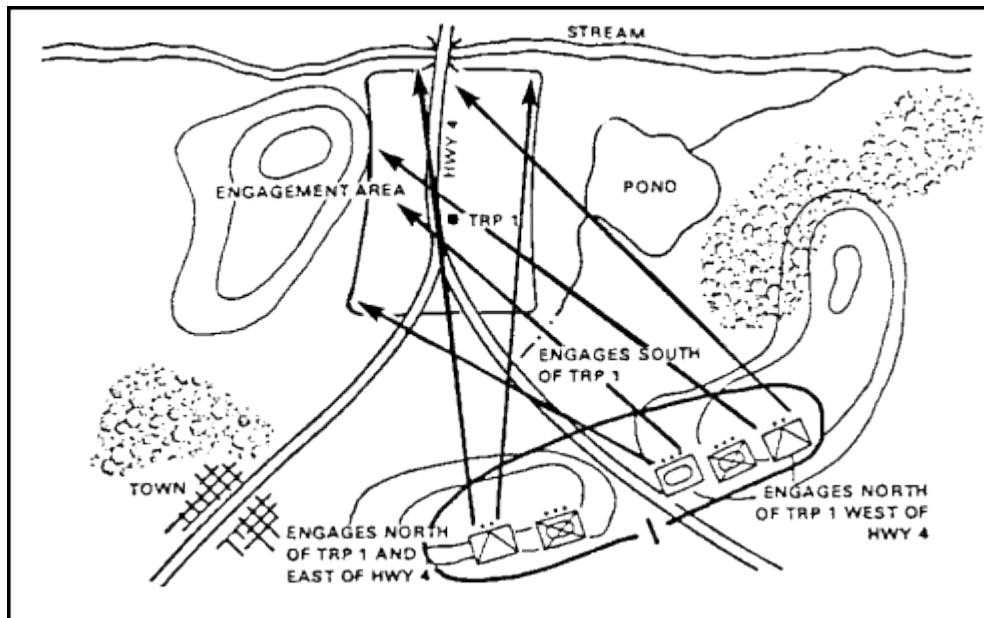
**Figure 2-5. Sectors of Fire.**



**Figure 2-6. Use of Target Reference Points.**

(b) Engagement Area. An engagement area (shown in [Figure 2-7](#)) is an area alongside a mounted enemy avenue of approach defined by the terrain around it. This surrounding terrain must be easily identifiable. It must be located so that the fires of multiple friendly forces can concentrate onto it. Engagement areas may be used at platoon, company, and battalion levels. Other measures, such as target reference points (TRPs) and phase lines, should be used along with engagement areas to further control and distribute fires. For example, if a mounted enemy avenue of approach is narrow or if the fire of an entire platoon is needed in a critical area, such as a choke point, sectors of fire can overlap. Because this increases the problem of control and the probability of target overkill, other control measures (engagement priorities, fire patterns, TRPs) are also needed. When

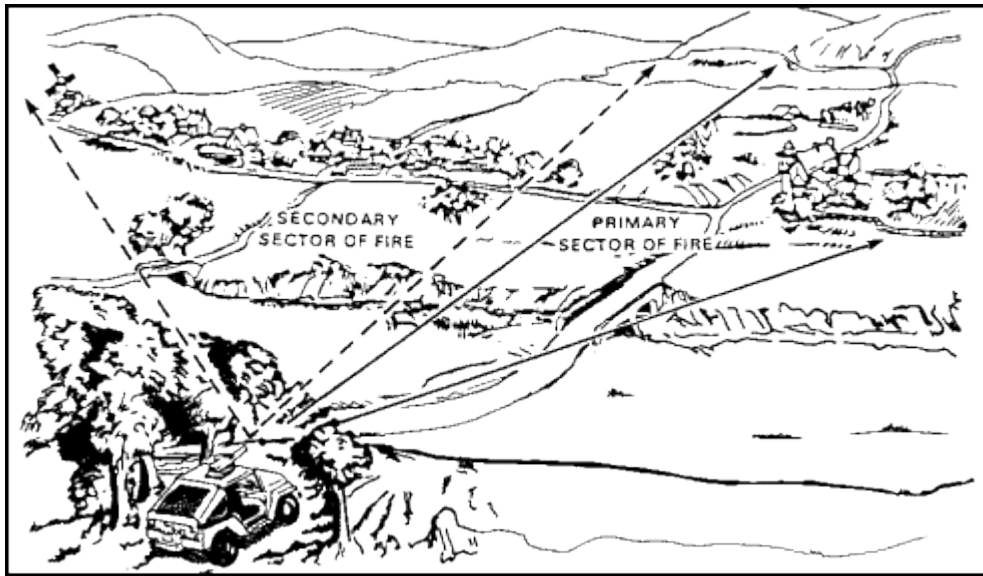
sectors of fire overlap, leaders must select positions where they can observe and control fires.



**Figure 2-7. Engagement Area.**

(c) Target Reference Points. A target reference point is an easily recognizable, natural or man-made point on the ground, such as those shown in [Figure 2-8](#). It is a reference point for designating targets, for shifting fire, or for assigning sectors of fire.

In the defense, target reference points are located along mounted avenues of approach. In an attack, they are located where the enemy is likely to be and on prominent terrain features. To avoid confusion, target reference points should be limited to the number required to distribute and control fire. Target reference points may be used to control both direct and indirect fires. When a target reference point is used to designate targets (as shown in [Figure 2-8](#)), directions are given by the compass rather than by right or left because each squad may be facing the target reference point from a different direction.



**Figure 2-8. Primary and Secondary Sectors of Fire.**

Target reference points are numbered sequentially using three-digit numbers. However, the numbers are not chosen at random. When a target reference point is recommended and accepted as an indirect fire target, it is given a number from an assigned block of target identification numbers. A target identification number has two letters and four numbers--for example, AB 5010. When applicable, the identification numbers are recorded on range cards and sector sketches for easy reference and coordination. To simplify fire commands in a direct-fire engagement, targets may be referred to by the last three digits--for example, target AB 5010 may be referred to as TRP010.

(d) Phase Lines. A phase line is a linear control measure normally used to control movement. It is also used to control and distribute the fire of several widely separated antiarmor squads or platoons.

Any prominent natural or man-made linear terrain feature, such as a ridge line, road, railroad tracks, river, or stream, may be used to designate a phase line. In either offensive or defensive operations, crossing a phase line can be a signal to start or stop firing, to shift fire to another sector, or to indicate when squads, sections, or platoons should move to alternate or supplementary positions. [Figure 2-9](#) shows a platoon leader using phase lines to cue his squads to fire and displace to an alternate position.





**Figure 2-9. Use of Phase Lines to Control Fires.**

Phase lines also can be used to specify when target priorities are to change. For example, the platoon leader might say, "I want both sections to engage only tanks until the enemy reaches PL Silver. Then I want Section 1 to begin engaging BMPs and any command vehicles identified." In addition to being a simple and effective control measure, a phase line can be assigned as an emergency control measure when radio communication is interrupted. Section leaders know that if the enemy reaches a designated phase line, they are to follow their orders without further communication.

#### 11. Engagement Priorities.

Targets in battlefield formations vary; they can be tanks, BMPs, BRDMs, BTRs, or air defense vehicles.

TOW fires can be distributed rapidly and controlled effectively if a priority of engagement is assigned to all the sections or if each section is assigned a specific type of vehicle to engage initially. For example, one section can engage tanks while another engages command vehicles and BMPs. This method works best during offensive or retrograde operations when surprise targets may appear, allowing little time for detailed instructions. Regardless of engagement priorities, a target presenting a threat to a unit must be engaged immediately.

Code words may be used to change engagement priorities. For example, a code word can be used to shift priority from tanks to air defense vehicles when the latter threatens friendly air operations. Engagement priorities are also useful when neither sectors of fire nor overlapping sectors of fire have been assigned. Like phase lines, engagement priorities are useful if communications are lost.

### **PART B - PLAN AND PREPARE FOR OFFENSIVE OPERATIONS**

#### 1. Offensive Operations.

At best, antiarmor company overwatches the maneuver or assault force of the battalion task force or supports this force by fire. The task force and the antiarmor company commander identify overwatch or support-by-fire positions to protect the maneuver force. The antiarmor company performs the following actions:

- Places destructive, suppressive fires upon known and suspected enemy positions.
- Adjusts indirect fires if needed to support the maneuver force.
- Protects the maneuver force against counterattacks.

Destroying the enemy's fighting force is the only sure way of winning. Therefore, forces attack mainly to destroy enemy forces. Offensive operations may also have secondary purposes, all of which contribute to the enemy's destruction. These secondary purposes include:

- Gaining information.
- Deceiving and diverting the enemy.
- Disrupting enemy command and control and CSS assets.
- Securing key or decisive terrain.

The success of the attack depends in part upon how well the commander understands the dynamics of battle. It also depends upon how he applies the operational concepts of an attack during both its planning and execution phases.

## 2. Characteristics of Offensive Operations.

Offensive operations have five characteristics:

- Concentration.
- Surprise.
- Speed.
- Flexibility.
- Audacity.

a. Concentration. Concentration of effort is essential. Successful attacks are usually launched from sudden concentrations and dispersed rapidly as the penetrating forces move into the depths of the defended area. They succeeded by massing unexpectedly where they can achieve a brief local superiority and by preserving their initial advantage through relentless exploitation. When concentrating forces for the attack, the commander must avoid patterns or obvious movements that indicate the attack's timing or direction. Mobility, speed, security, and deception are essential to successful concentration of forces. Concentration also applies to CS and CSS elements. Cooperation between and integration of these assets are essential to maintaining momentum. Disrupted engineer support, air defense coverage, field artillery (FA) fires, communications, and logistic support limit the success of offensive actions.

b. Surprise. Surprise can be attained by moving quickly, by doing the unexpected, or by deceiving the enemy. The commander must strive to surprise the enemy. The initiative of the offensive allows him to choose the time, place, and means of launching the attack. The basic requirement for surprise is to strike the enemy at an unexpected place and time. This means avoiding the enemy's strengths and attacking his weaknesses, which is referred to as the indirect

approach. Through the careful use of surprise, the commander can strike when and where the enemy least expects, which contributes to the likelihood of success. Surprise can also be achieved by infiltration or night attacks.

c. Speed. "Speed" is a relative term that refers to the enemy's ability to react. An attack must move rapidly. The commander must decide and react faster than the enemy. The use of speed keeps the enemy off balance, contributes to the security of the battalion, and degrades the defender's countermeasures so that they cannot keep pace. The use of speed allows a unit to shift its strength quickly for wider penetrations, to roll up exposed flanks, and to reinforce success. The enemy must not be allowed to recover from the shock of an initial attack.

d. Flexibility. Flexibility is necessary for success. The plan of attack must allow for developments and reflect the uncertainties of offensive combat. It must allow the exploitation of opportunities that arise in the course of operations. The commander must avoid fixing his attention on his initial attack so completely that he is unaware of other opportunities for success; he must be able to change quickly between offense and defense (with attended task organization changes), to conduct continuous operations, and to fight on an integrated battlefield. He must be prepared for diversions from the original plan, which should include provisions for changing the direction or location of the main effort.

e. Audacity. An audacious commander is one who is daring, confident, and original. Boldness and the willingness to take risks have always been the keystones of a successful offense.

The battalion normally takes offensive action against forces larger than a company IAW Airland Battle doctrine. The battalion can fight at less than three-to-one odds because it does not accept decisive engagement. The concept of combat power is more than just the sum of a force's combat systems. On a nonlinear battlefield, the battalion usually encounters an unprepared enemy force. When this happens, the antiarmor company may be able to achieve one or more of the following favorable situations:

- The battalion can surprise the enemy.
- The battalion catches the enemy undeployed.
- The battalion is in a position of advantage.
- The battalion catches the enemy force during movement.
- The battalion can plan overwhelming firepower upon the critical point in the battle.

In these situations, the battalion can engage a force larger than a motorized rifle company with a chance of being successful. However, this action must be consistent with the higher commander's mission statement and intent. Audacious commanders apply the principle of surprise. To defeat a much larger opponent, they use the indirect approach to strike him at an unexpected time and place.

### 3. Planning Considerations.

Operations planning is less detailed at the company level than at the battalion level. Company commanders make their own estimates and plans. They must also give their subordinates time to plan. Planning includes developing a scheme of maneuver and a fire support plan.

a. Scheme of Maneuver. The scheme of maneuver reflects the commander's intent and plan to position elements. The scheme has enough detail to ensure that subordinates understand the purpose of the operation. The scheme of maneuver

- identifies objectives for platoons and assigns responsibilities and tasks.
- states the route and formations used to get from the line of departure (LD) to the BP. Routes chosen should cover and conceal, allow the unit to move rapidly, avoid obstacles and enemy kill zones, and mass combat soldiers on the enemy flank. Movement formations give the company flexibility to react.
- identifies the primary, alternate, and supplementary positions for the platoons. Having positions allows the commander to direct TOW missiles onto the likely infantry avenue of approach.
- describes the commander's plans to use the platoon's fires to destroy the enemy in the engagement area. The commander identifies the TRPs and trigger lines based upon how he views the battle and intends to defeat the enemy. He establishes disengagement criteria to prevent the company from becoming decisively engaged.

b. Fire Support Plan. The effective use of supporting fires is critical to the success of combat operations. The fire support plan complements the scheme of maneuver and shows how the commander plans to use fire support (mortars, artillery, precision-guided munitions, close air support, NGF). The commander gives the FSO requirements and tasks that support his concept. The FSO determines available fire support assets and whether those assets can accomplish the tasks. Known or suspected enemy positions are identified by the S2 or by the commander's reconnaissance, and fires are planned upon them. The plan covers the following actions:

- Suppression or destruction of the enemy's direct-fire weapon systems.
- Breaking up of enemy fortifications.
- Degradation of enemy command and control.
- Destruction of enemy logistics sites.
- Screening company movement.

#### 4. Stages of Fire.

Three stages of fires are planned:

- Preparatory fires.
- Fires during engagement.
- Fires in support of disengagement.

a. Preparatory Fires. Preparatory fires are intense volumes of fire delivered according to a schedule. They suppress enemy direct-fire weapons and support the movement of the company

b. Fires During Engagement. Fires during engagement are provided to:

- Destroy or suppress enemy weapons.
- Isolate the enemy within the engagement area.
- Stop second-echelon forces from reinforcing the enemy.
- Lower the enemy's counterattack ability.

c. Fires in Support of Disengagement. Fires, in support of disengagement, target likely enemy counterattack and withdrawal routes. This helps destroy the enemy and allows the company to withdraw to new positions. During this stage, fires screen the movement of the company to its new positions.

## 5. Fire Support Considerations.

Fire support considerations include the following:

- Number and type of fire support units available.
- Number of COLTs available.
- Priority targets.
- Priority fires.
- Identification and timing of preparatory fires.
- Use of nuclear and chemical fires by higher headquarters.
- Effect of fires in creating obstacles.
- Close air support.
- Timed fires.
- Smoke.
- Allocation of Copperhead target.

## 6. Troop-Leading Procedure.

Troop-leading procedure is continuous and begins upon the receipt of the mission. It is a series of steps used by the company commander to plan, coordinate, execute, and supervise operations. The steps need not be performed in the following order, nor is there a clear beginning for each step. For example, the commander can issue a warning order while conducting his estimate of the situation:

a. Receive and Analyze the Mission. Company commanders receive their mission in an oral or written operation order (OPORD), fragmentary order (FRAGO), or warning order. Upon the receipt of this order, a commander begins his estimate of the situation and plans the use of available time. The commander uses the information available in the battalion OPORD to determine the mission, its purpose, and the constraints upon the company. This information is in the battalion's mission statement, in the intents of the battalion and brigade commanders, and in the coordinating instructions. The commander then considers the factors of METT-T and other

relevant factors to determine implied missions. Using this information, the commander determines how to restate the mission for the company and how to accomplish the mission.

When a unit receives a new mission, the most crucial resource is time. The leader should use only one-third of his time for company planning and should leave the rest for his subordinates to plan, reconnoiter, and issue their subsequent orders. This one-third rule increases the chance for mission success. It allows time for the commander's intent and concept to be carried to and understood by the whole unit. This knowledge helps create a sense of purpose in the unit, which makes the unit more effective.

b. Issue the Warning Order. The company commander issues a warning order explaining the restated mission. He issues it as soon as he receives a warning order or other information about an impending mission. Warning orders are issued through the chain of command to ensure that all personnel are informed. No standard warning order format exists. However, the warning order must include the following:

- An addressee.
- The time and nature of the operation.
- The earliest time of the move or degree of notice.
- The time and place that the operation order will be issued.
- New information may also be issued in the warning order. If time is too short for a FRAGO or an OPORD to be issued, a warning order may have to suffice.

c. Make a Tentative Plan. The company commander's tentative plan states how he intends to accomplish the mission. He must analyze the factors of METT-T. Developing the plan is not a mechanical process. It is one that requires the commander to use his judgment. The result of this step is the commander's concept of the operation. The commander's plan is based upon his knowledge of the following factors:

- His knowledge of the situation.
- The mission analysis.
- The estimate of the enemy's situation.

The estimate is based upon patrol reports and on information from battalion S2.

The commander continues by choosing a COA, which is his tentative plan. He can change the plan based upon the leader's reconnaissance or new information. The tentative plan forms his concept of the operation and includes a scheme of maneuver and a fire support plan. This plan is the basis for the following:

- Coordination.
- Unit movement.
- Reorganization.

- Reconnaissance.

The mission statement includes the mission's

- who.
- what.
- when.
- where.
- why.

Since the company commander has no staff, he can discuss his plan with subordinates or attached personnel. This gives subordinates a better view of the commander's concept and gives attached personnel a chance to advise in their areas of specialized knowledge.

d. Start Necessary Movement/Begin Preparation. The company commander acts quickly, using available time well so that his platoon leaders can move, reconnoiter, and prepare their units. If the company is to move a great distance before the operation, it should be moved upon the receipt of the battalion's warning order. If the company is to take part in a tactical or a strategic airlift, preparations should start after the company warning order is issued. This permits platoons and the commander to arrive at the terrain early. When the commander is called to receive an order, he brings with him his company fire support officer and executive officer. The executive officer returns to the unit with the warning order and, in the commander's absence, moves the company. The first sergeant supervises the logistical operations. He coordinates the fuel, ammunition, medical, maintenance, transportation, and food support. The commander reconnoiters, checks his plan, and issues his final order. When the company conducts a tactical movement, many of the tasks involved are routine and should be part of the company SOP.

e. Reconnoiter. Sometimes commanders must issue orders based upon a map reconnaissance. They should do this only when a ground reconnaissance cannot be conducted. A ground reconnaissance shows the commander whether his concept will work on the terrain. The commander takes his company fire support officer, platoon leaders, and a security force with him during reconnaissance. They travel by covered and concealed routes to one or more vantage points and observe the terrain. The security party provides overwatch while the leaders reconnoiter. If ground or air reconnaissance is not possible, then the commander should request any new information on the terrain, such as detailed maps and photographic reconnaissance.

f. Complete the Plan. Reconnaissance may change the plan and add detail. New information is used to refine the tentative plan and to make any final changes to the operation.

g. Issue Orders. Company commanders rarely issue written orders. Normally, the commander prepares his notes in the five paragraph order format and gives an oral order. He should give it to his orders group, which consists of the following individuals:

- His executive officer.
- The company fire support officer.

- The platoon leaders.
- The first sergeant.
- The leaders of attached elements.

The graphics that support the operation should be on the commander's map already and should be copied on subordinates' maps before the order is given. When the concept of the operation is given, the commander should use either a terrain model or sketches or he should give the OPOD while overlooking the area of operations to illustrate his concept. This ensures that subordinates understand the concepts of maneuver for their element and other elements. By having his subordinates brief him back or walk through the plan, the commander can ensure that it is understood.

h. Supervise. A leader supervises the preparation (precombat checks and rehearsals) and the execution of the mission. Constant supervision is as important as the issuance of the order. Officers and noncommissioned officers ensure that all phases of the preparation are complete.

i. Mission, Enemy, Terrain, Troops, and Time (METT-T) Analysis. METT-T analysis is used as an analytical framework for planning combat operations. The following shows how it can be used to accomplish a mission:

(1) Mission. The following questions focus upon METT-T analysis in regard to the combat mission:

- What is the intent of my battalion or brigade mission?
- What are the missions of my unit? What am I expected to accomplish? (Both stated and implied missions must be considered).
- What is the intent of my mission?
- In considering how to accomplish the company mission, have I assigned the correct missions and tasks to my subordinate elements?
- How much time do I have? What times are critical--for example, SPs, RPs, or LP?

(2) Enemy. The following questions focus upon METT-T analysis in regard to the enemy:

- What is the enemy's composition and what are his abilities? (This information is basic to understanding the enemy)
- What is the enemy's strength (weapons, supporting fires, special munitions, organization)?
- What is the enemy's disposition? What avenues of approach would support his tactics (front, flank, mounted, dismounted, air)?
- What tactics and formations will the enemy use in relation to my plans?



(3) Terrain and Weather. The following questions focus the METT-T analysis upon the terrain and the weather. What effect will the terrain have on my mission?

- To answer this, the company commander analyzes the terrain based upon OCOKA:
  - O - Observation and fields of fire.
  - C - Cover and concealment.
  - O - Obstacles.
  - K - Key terrain.
  - A - Avenues of approach.
- Will the weather hamper or enhance the operation of my systems, units, or supporting units? What can I do about it?
- Will the weather change the trafficability of the area?
- How much space do I have? Is it adequate? How does it affect my unit?
- What is the effect of these factors on the use of obscurants and employment of chemical weapons?

(4) Troops. The following questions focus the METT-T analysis upon troops:

- What type of forces are available?
- What is the strength of the available forces?
- What are the abilities of my subordinate elements?
- What CS and CSS are available?

(5) Time Available. The following questions focus the METT-T analysis upon the time that is available:

- How much time do I have before the mission begins?
- How much time will the enemy need to get here?
- How much time will the company need to get there?
- How long should the enemy stay in the engagement area?

j. Operations Security. Operations security includes all measures taken to maintain security and achieve tactical surprise. It includes the following:

- Countersurveillance.
- Physical security.
- Signal security.

- Information security.

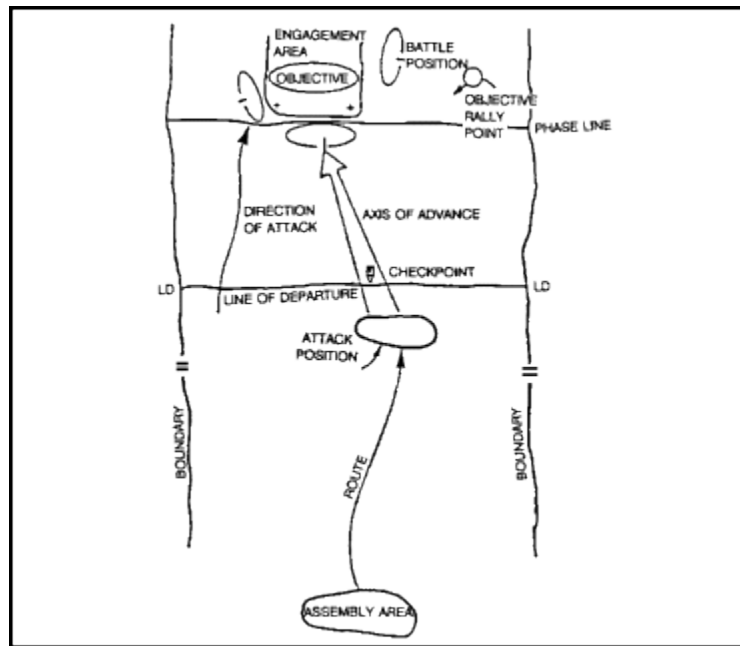
It also involves identifying, eliminating, or controlling tactical indicators that can be used by the enemy.

- Operations security (OPSEC) is a command responsibility. All personnel must practice good OPSEC procedures before and during the battle. This requires high standards of discipline and training.
- Enemy forces use a wide range of intelligence-gathering sources to learn locations, abilities, and intentions of friendly units. These sources can include the following:
  - Ground reconnaissance elements.
  - Photographic and signals intelligence.
  - Espionage.

Operations security measures should be considered during the planning and conducting of each operation and after each afteraction report.

- To provide effective OPSEC, the company commander must see the enemy first. Although the commander must depend upon the battalion for intelligence, he can include the following checklist in his SOP to avoid OPSEC violations:
  - Observation posts are used to cover areas that are hard to observe.
  - Positions, vehicles, and equipment are camouflaged.
  - Defilade positions are used for concealment and to reduce exposure.
  - Noise and light discipline are enforced to reduce the possible detection of the unit in day or night.
  - Smoke is planned and used when necessary.
  - When communications security (COMSEC) devices are unavailable or nonoperational, friendly graphic control measures are encoded using the current signal operation instructions (SOI). Enemy locations are sent by radio.
  - Radio transmissions must be fewer than 15 seconds with a break between transmissions.
  - The SOI authentication tables are used. Platoons request authentication either when a change in the mission is received, when the authenticity of a transmission is in doubt, or when a net is opened or closed.
  - When jamming, interference, or deception is detected, the company submits a meaoning, intrusion, jamming, and interference (MIJI) report.
- The key to operations security is reducing electronic, visual, thermal, and operational signatures.

k. Control Measures. Several control measures (shown in [Figure 2-10](#)) are commonly used in the offense.



**Figure 2-10. Offensive Control Measures.**

- (1) Objective. The objective is the physical object of the action to be taken. Objectives are assigned based upon the location of the enemy. They do not imply physical occupation by the company. A terrain feature is assigned as the objective if the enemy is known to occupy it. Terrain features may also be assigned to provide direction to the unit's efforts when the enemy's likely position is learned during the installation property book (IPB) process. The objective may also be named as the engagement area and battle position.
- (2) Boundary. A boundary is a control measure drawn along known terrain features to mark zones of action and areas of tactical responsibility. Within their boundaries, units may fire and maneuver IAW the overall plan without coordinating with neighboring units. Without coordination, they can place direct fire across boundaries upon defined enemy targets. With coordination, they can also use indirect fire.
- (3) Axis of Advance. An axis of advance is a general route of advance in the direction of the enemy. It graphically shows the commander's intention. Axes follow terrain suitable for the size of the force assigned. Deviation from an assigned axis must not hinder the maneuver of adjacent units.
- (4) Direction of Attack. The direction of attack is a specific direction or route that the main attack or the main body of the force will follow. It is more limited than an axis of advance. Units are not free to maneuver off the assigned route.
- (5) Line of Departure. The line of departure is a line designated to coordinate the commitment of attacking units or scouting elements at a specific time.

- (6) Attack Position. An attack position is the last position occupied or passed through by an attacking force before it crosses the line of departure. It must be covered from direct fire and concealed from enemy observation but be close to the line of departure.
- (7) Assembly Area. The assembly area is where a force prepares or regroups for action. They should provide concealment, dispersion, suitable routes forward, and security from ground and air attacks. While the force is in an assembly area, orders are issued, maintenance and supply are accomplished, and organization for combat are completed.
- (8) Phase Line. A phase line is used for the control and coordination of military operations. Phase lines follow known terrain features and are drawn perpendicular to the axis of movement.
- (9) Target Reference Point. A target reference point is a point on the ground that is used to identify enemy targets or to control fires. They also make up indirect-fire targets. The commander's choice of TRPs decides his direct-fire planning.
- (10) Checkpoint. A checkpoint is a reference point used to coordinate friendly movement and to ease control. Using checkpoints, a leader may quickly and correctly report successive positions. Checkpoints are not used when reporting enemy locations.
- (11) Engagement Area. An engagement area is an area where the commander intends to trap and destroy an enemy using the massed fires of all available weapons. Engagement areas are identified by TRPs. Their purpose is not to restrict fires or to make operations static. They are chosen based upon likely enemy deployment and avenues of approach. Engagement areas are used to effectively concentrate fires. For the light attack company, engagement areas and objectives may be the same terrain.
- (12) Objective Rally Points (ORPs). These points are where the company can reorganize after an attack. They are close to the objective after an attack. They are close to the objective and provide cover, concealment, and security to the unit. While in the objective rally point, soldiers, equipment, and supplies are cross-leveled and resupply requested from a higher unit.
- (13) Battle Position. A battle position is a location where a unit may attack by fire or guard against counterattack from the most likely enemy avenue of approach. Battle positions are arranged to best meet the enemy and to use maximum standoff. The company is assigned a battle point in which the company commander can select platoon battle points. Platoons and companies are located within the outline of the battle point to give early warning.
- (14) Route. A route is the prescribed course to be traveled from a specific point of origin to a specific destination.

## 7. TOW Employment in Restrictive Terrain.

Ideally, the infantry fights in restrictive terrain. However, the TOW system was not designed for close terrain because of its minimum arming range and the limitations of its wire guidance. In some

situations, brigade headquarters may task-organize the TOW units from their assigned battalion to higher control or to another battalion task force. This allows the TOWs to be used in more suitable terrain. If the TOWs remain with their battalion, commanders, S3s, and antiarmor leaders are tasked to conduct a thorough estimate of the situation to decide on the best use of their antiarmor unit.

In this subcourse, restrictive terrain is defined as it applies to the use of TOW. The terrains described below are examples of the type of the restrictive terrain in which infantry forces operate. Often, the categories blend together in a given sector for example, forests and steep hills.

- a. Forest and Jungles. The degree and type of forestation affect the employment of antitank guided missiles.
  - (1) European-Model Forests. European-model forests are well-tended, free of underbrush or secondary growth, and often hilly. Unopposed armor can traverse them rapidly because of their large number of good trails. If armored vehicles are forced off the trails, tree thickness, tree spacing, and degree of slope determine how freely they can maneuver. The lack of undergrowth often allows visibility to several hundred meters. Asian rubber plantations fall into this category of forest.
  - (2) Cut-Over or Primeval Forests and Jungles. Cut-over or primeval forests and jungles have thick patches of vegetation and poor trail networks. Armor can travel through these forests if the ground is dry and not too steep, but such "jungle-busting" is slow and visibility and engagement ranges are very short, often in the tens of meters. ATGMs are often useless unless fire lanes are cut through the underbrush.
- b. Hills and Mountain Ranges. Degree of forestation on hills affect the employment of antitank guided missiles.
  - (1) Forested Hills. Forested hills usually force armor to move on trails, thus channelizing mounted movement. This movement restriction may allow carefully positioned TOWs to engage vehicles that cannot maneuver out of an engagement area (EA). Tree growth and underbrush restrict visibility and engagement ranges, so TOW leaders must place TOWs carefully for maximum range.
  - (2) Bare Hills and Mountains. Bare hills and mountains often will allow engagement out to maximum TOW ranges, and the steep terrain and lack of roads again channelize maneuver. This good visibility can work both ways. A mounted enemy can include smoke, if TOW units fight from obvious positions. TOW units may often fight from obvious positions. TOW units may often have to sacrifice standoff to gain surprise and thus some protection from preplotted suppressive fires.
- c. Swamps and Wetlands. True swamps stop all mounted movement except on hard surfaced, elevated roads. Floodplains and moors can support at least lightly armored vehicles but are often trafficable during dry periods only. In northern Europe, terrain broken by drainage ditches and dikes is common; this type of terrain prevents armor from moving off roads. Visibility is good when the weather is clear, allowing for long TOW shots. As in mountains, this good visibility also makes suppression of obvious ATGM firing positions much easier.

d. Urban Areas and Villages. Degree of urbanization also affects the employment of antitank guided missiles.

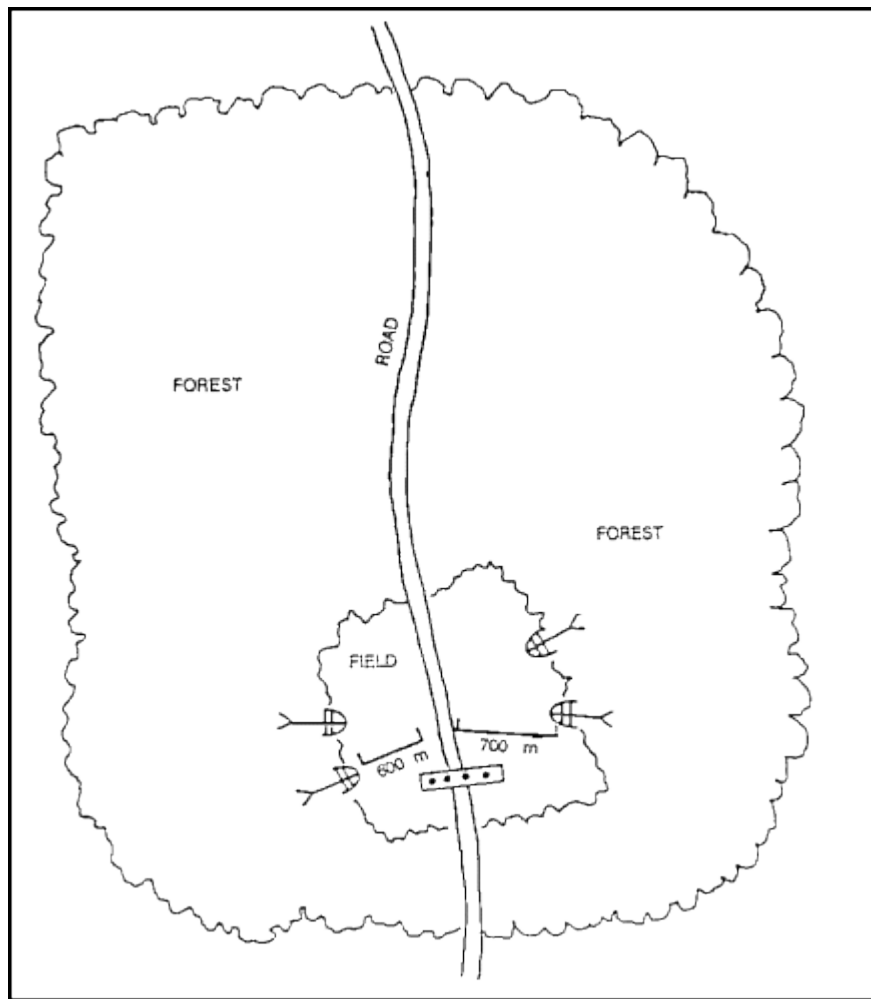
(1) Urban Areas. Inside urban areas, rubble and urban construction limit TOW engagement ranges. Most of the longer range shots are frontal and obvious--for example, shots down boulevards. Parks and railyards, where flanking shots are more common, probably offer the best engagement areas for TOWs.

(2) Villages. Village or town outskirts and suburbs often contain both suitable firing positions and reasonable TOW engagements with TOWs sited to fire into engagement areas directly outside the village edge. Unfortunately, these areas are prime candidates for concentrated artillery suppression. Having a defense based upon positions in woods and villages, with interlocking fires that trigger when the enemy reaches the center of the sector, somewhat offsets the effectiveness of artillery suppression. The enemy must spread his fires out to cover a series of positions. He may not be able to call for fires quickly enough if he is surprised by massed antiarmor fires from several directions at once.

#### 8. Guidelines for Employment.

The basics of TOW employment still apply when TOW units operate on restrictive terrain. However, commanders and leaders must look at these basics from a different perspective. Certain principles can be more important than others, depending upon the situation. Leaders can use TOW best in ambush scenarios where TOW units fire from nonobvious positions to surprise the enemy and where TOW, other ATGM, infantry fires, and mines are closely tied together. Finally, commanders must realize that since using TOWs in difficult terrain is less than ideal, they should do so only if METT-T dictates. The following subparagraphs discuss the seven principles of TOW employment as modified to meet the conditions of restrictive ground.

a. Mutual Support. This is vital when terrain restricts range. Instead of massing TOW fire into an engagement area, as can be done when adequate range is available, leaders may have to mass firing units and increase the risk of enemy suppression to bunched-up TOWs. Leaders can reduce the effectiveness of enemy artillery by positioning TOWs in less obvious patterns. Finally, the size and shape of the engagement area determines the degree of mutual support needed. [Figure 2-11](#) shows two TOW sections massed for mutual support, engaging targets with volley fire.

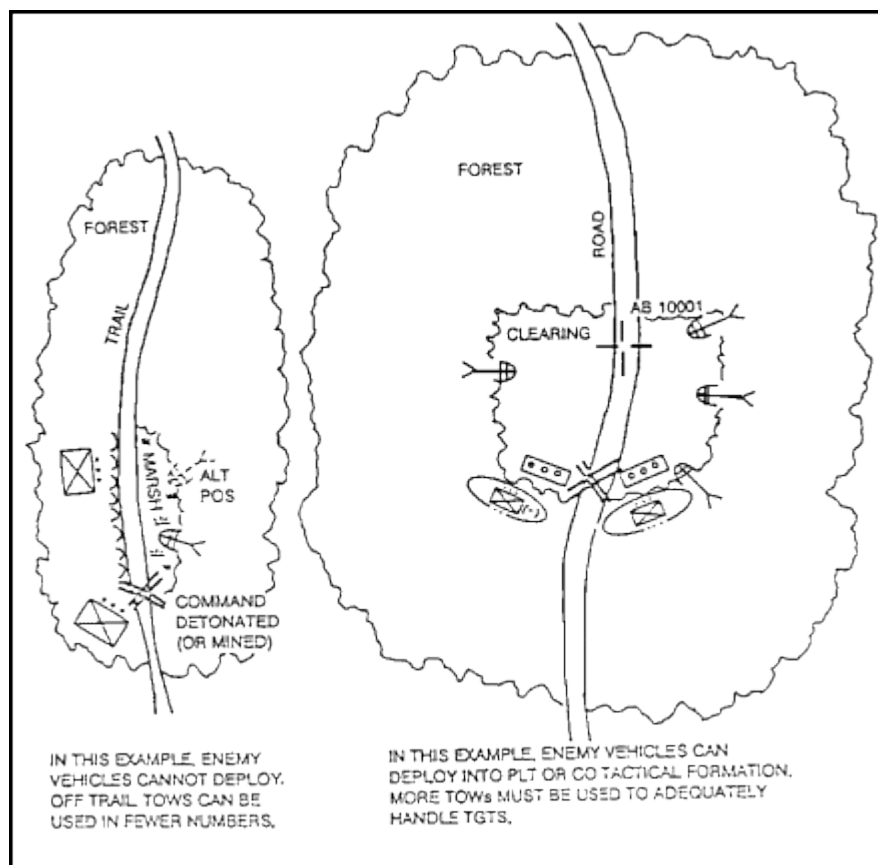


**Figure 2-11. Massing TOWs for Mutual Support.**

- b. Security. Shorter ranges and the ample concealment associated with restrictive terrain make TOW crews more vulnerable to dismounted infantry. TOWs should be positioned so that infantry can protect them. Difficult terrain tends to "soak up" infantry, so TOW units must be able to protect themselves sometimes. This means that they can man fewer TOW systems--for example, a TOW section can crew a TOW while the second squad performs security.
- c. Flank Shots. These are critical because surprise engagements are the best way to overcome slow tracking times and obvious signatures. The feasibility of flank shots often determines whether or not TOWs should be used. Enemy armor is thickest on the frontal slope of a tank. Also, crewmen concentrate upon their immediate front and are usually more vigilant in close terrain. At short ranges, a tank gunner or commander may fire his main gun or coax machine gun reflexively in reaction to the flash of a TOW launch. Seeing them fire can be enough to cause the TOW gunner to flinch. Flank shots are so important that leaders should consider giving up range if by doing so they can take advantage of flanking shots. Units should be trained to watch for chances to make flank shots.
- d. Volley Fire. Leaders can use mass and volley fires to offset short engagement ranges. Again, the width and the depth of the engagement area sets the perimeter for TOW use. The amount of

ground available for enemy engagement is a key factor, as [Figure 2-12](#) suggests. TOW leaders must calculate the time of flight carefully. A three- to five-second flight time will allow gunners enough time to steady their tracking without allowing enemy vehicles to react fully to a surprise engagement. Engagement ranges between 1,000 and 1,500 meters expose TOW crew members for too long unless their fires are complemented by other weapons. Engagements over 1,500 meters give TOWs advantages: reduced signature detection and Threat suppression.

e. Cover and Concealment. Good TOW positioning and use of camouflage are especially important in restrictive terrain. Although TOW units often fight from prepared positions, infantry units seldom have enough engineers available to make extensive terrain modifications. Often TOW units must fight from hasty positions--both dismounted and mounted--which can be built with little help from engineers. Fire lanes are important in restrictive terrain. TOW units must use existing fire lanes such as fire breaks, forest trails, and power line rights of way. They must also be trained to cut fire lanes and to strive always for flank shots. However, without engineer aid, the construction of most fire lanes takes too much time and labor. Sometimes the unit can find a lane that needs little work, such as one that requires the removal of only a few large bushes or scrub trees.

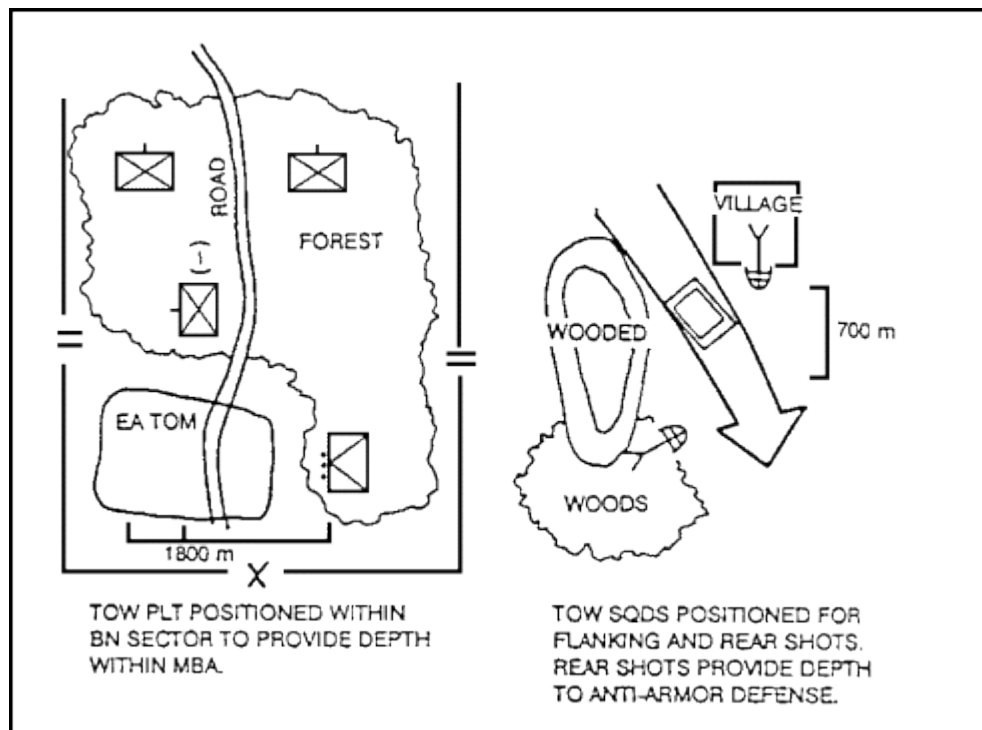


**Figure 2-12. Affect of Engagement Area Size on TOW Positions and Employments.**

f. Employment in Depth. The lack of long-range shots limits a unit's ability to position TOW squads or sections in depth. However, battalions can create depth by positioning TOW platoons within the battalion sector where TOW can use its 2,000 metersplus range. One technique that

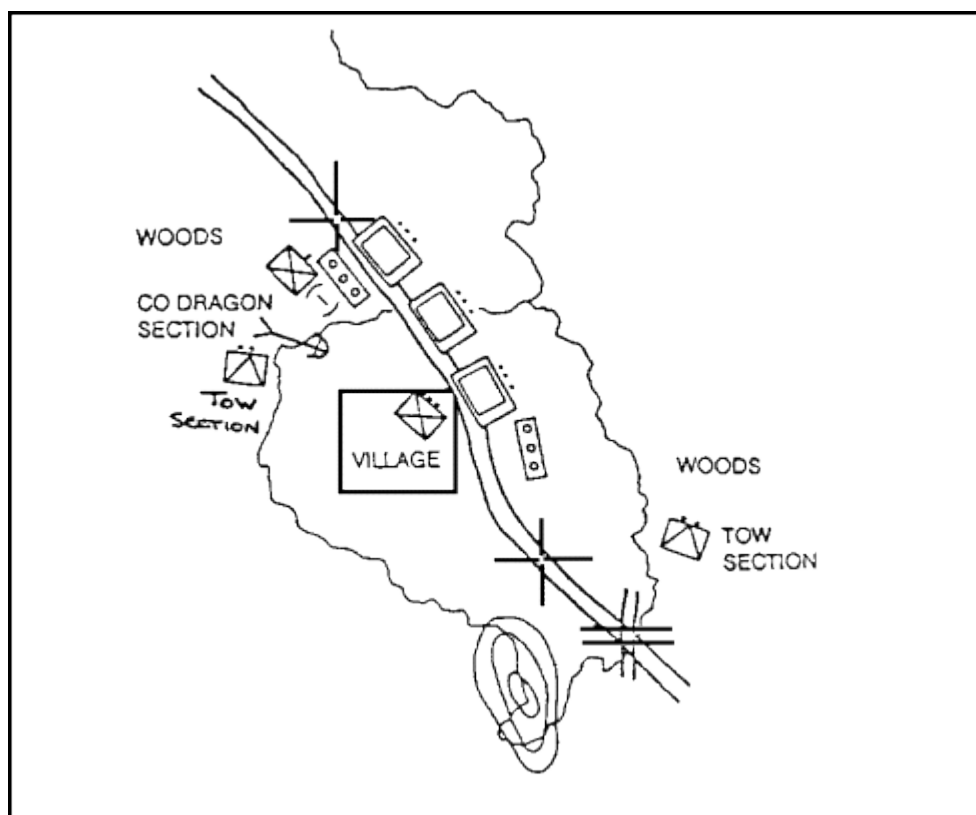


can be used to achieve depth is emplacement of TOWs so that they can fire into engagement areas from the rear and flanks at the same time, as shown in [Figure 2-13](#).



**Figure 2-13. Employment in Depth.**

g. Employment as Part of a Combined Arms Team. TOW units must be employed as part of a combined arms effort. Infantry units that skillfully blend TOW, Dragon, AT4, mines, and other obstacles, small arms or machine guns, M203s, and indirect fires in surprise engagements can devastate an unwarned enemy strung out on restrictive terrain. Leaders should try to position all antiarmor weapons so that all rounds impact upon the enemy formation at the same time. Volley fire techniques are especially effective in this situation, as [Figure 2-14](#) indicates.



**Figure 2-14. Employment of TOW as Part of a Combined Arms Team, All Antiarmor and Antipersonnel Fires Massed.**

9. Preconditions for TOW Employment.

Leaders must do the following things before they can position TOW units:

- a. Conduct a Detailed METT-T Analysis. The use of the TOW in restrictive terrain presents few obvious choices. Each leader must think about the unique aspects of his tactical situation and carefully decide which principles apply.
- b. Make a Detailed Ground Reconnaissance. A map reconnaissance is not adequate. It serves only as a starting point. Leaders who conduct a reconnaissance may find that the right fold or break in the ground where a TOW can be positioned or the reconnaissance may reveal that the TOW cannot be used on that ground. Especially in the defense, a good reconnaissance can cut down on the amount of engineer effort needed as leaders find natural cover that needs little reinforcement.

10. Offensive Operations.

Because they lack range and have little opportunity for reconnaissance beyond the line of departure (LD), TOWs can usually provide only limited support to dismounted infantry attacking through restrictive terrain. Units can still use TOW profitably in many cases, based upon careful reconnaissance and METT-T decisions. Commanders must also consider TOW employment in light of the enemy's capabilities.

a. Armored Enemy. An armored enemy defends with dug-in armor. Enemy infantry fighting vehicles/armored personnel carriers (IFVs/APCs) are supported by dug-in infantry. Unless the terrain allows TOWs to fire from overwatch positions more than 1,000 meters away, TOW units may not survive if they engage as an overwatch support fire force. Only if TOW units surprise the enemy with volley fires and if they outnumber the enemy can they survive, although, even then, the operation is a high-risk one. Two better options remain:

- The TOWs can cover the more open flanks of a restricted avenue of approach, or
- The TOWs can move quickly upon the objective to protect consolidating infantry or follow-on forces from armor counterattack.

b. Dismounted Enemy. Here, the enemy relies mainly upon dug-in infantry, possibly reinforced with a few dug-in tanks or APCs, on terrain, such as mountainous terrain, that restricts armored vehicle movement.

The best use of TOW units is providing fire support for a deliberate attack or infiltration. TOWs fire at hard targets such as bunkers, dug-in vehicles, weapons emplacements in trench systems, and fortified rooms in houses. TOW rounds penetrate several feet of dirt or concrete. While TOW rounds are less effective than HEAT or HEP rounds against bunkers, their performance is perfectly adequate.

Units can sometimes dismount TOWs. This usually makes stealthy occupation of positions easier. Often, TOW units can reach good firing positions by man-packing the TOWs. This may limit a TOW section to manning one weapon. If an infantry squad is available, its members can carry the extra missiles and provide security. If one is not available, a TOW squad must do it.

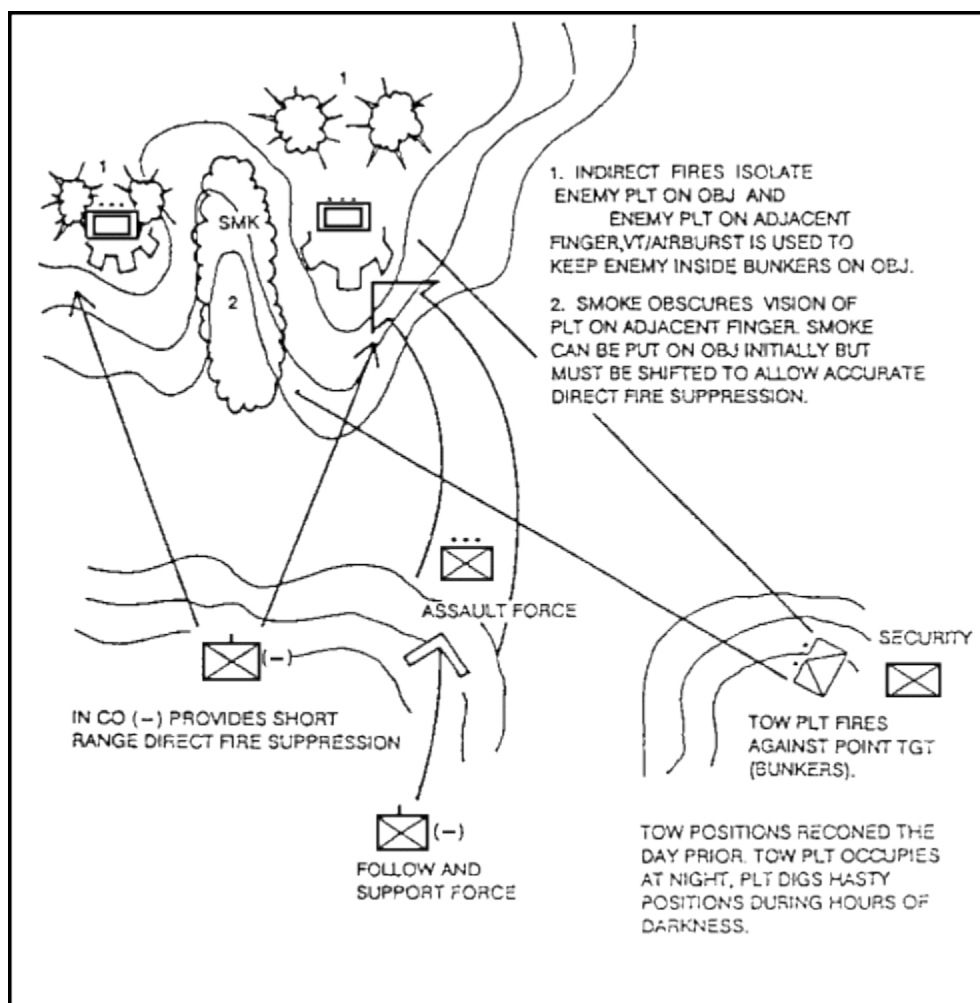
A good ground reconnaissance is needed to find the best protective position, especially if the objective is 1,000 meters or fewer forward of the support-by-fire position.

The antiarmor leader and assault force commander must ensure that signals for lifting fires and designating targets, such as M203 colored-smoke rounds, various colored star clusters, or infrared chemical lights, are coordinated before the attack begins.

TOW fires should be mixed in with artillery/mortar and small arms/machine gun fires. This array of fires distracts enemy gunners and prevents them from concentrating fires on TOWs. If possible, TOWs should be positioned away from the main infantry support-by-fire elements so that the enemy must shoot in two directions. Care must be used when employing smoke; it can blind TOW gunners (unless they have TOW 2s). TOW should be used either to knock out bunkers first before bringing down smoke or smoke and high explosive (HE) should be mixed to isolate the point of penetration, as shown in [Figure 2-15](#).

NOTE: To prevent damage to TOW wire, do not allow mortar and artillery fires to fall between the TOW position and the TOW targets.

TOW units can do the same mission at night, either using illumination or thermal night sights. If fired under illumination, TOWs should be brought closer because flares and shadows distort the gunner's vision through the TOW sight.



**Figure 2-15. TOW Supporting a Deliberate Attack of a Fortified Mountain Position.**

### **PART C - PLAN AND PREPARE FOR DEFENSIVE OPERATIONS**

The Threat uses several methods to counter US antitank guided missiles. The lethality of ATGMs depends upon how well the gunner acquires and engages enemy targets. Anything that prevents the gunner from doing this well serves to protect the target.

#### **1. Threat Measures to Counter ATGM.**

To counter ATGMs, the Threat emphasizes reconnaissance, destruction, and deception.

- a. Reconnaissance. The enemy recognizes that reconnaissance is needed to defeat US antitank defenses and, therefore, emphasizes it in all Threat operations. Continuous reconnaissance locates and targets US ATGM systems. To protect friendly forces from Threat ground reconnaissance elements, US forces must conduct effective counterreconnaissance operations. Units must use all available concealment and infrared-defeating camouflage nets. Using hide positions and dummy positions also helps give the enemy a false picture of the US defense.
- b. Destruction. Destruction of US antiarmor weapons is likely if Threat reconnaissance identifies and locates US ATGM positions. Once they find these positions, they fire 40 rounds (observed fire) or 140 rounds (unobserved fire) of 120-mm mortar or 122-mm howitzer to

suppress them. They can also use a 152-mm howitzer round to counter US ATGM fire. Each flechette round contains about 8,500 flechettes and covers an area about 30 meters in diameter.

The 152-mm howitzer can deliver the flechette round up to 17,000 meters. The round then explodes above the ground and scatters thousands of small, finned flechettes. These flechettes are effective against unprotected soldiers and equipment. The Threat then follows up with attack helicopters after the artillery preparatory fire. They seek routes that fire ATGM through the main gun of the tank. The T-64B and the T-80 tanks are known to fire the AT-8 Songster ATGM. The Songster has a 4,000-meter maximum range. The main role of these missile-firing tanks is to destroy antiarmor systems.

c. Deception. Deception as a doctrine for Threat survival includes the following:

- Camouflage to disguise, conceal, or distort.
- Exploitation of terrain.
- Use of darkness and weather to mask operations.
- Use of dummy or decoy equipment.
- Masking of light and sound.
- Use of searchlights and lasers to suppress ATGM gunners.
- Demonstration or diversionary actions.
- Communications security.

## 2. Defensive Operations.

Antiarmor fire must be planned in depth. In the defense, antiarmor sections or platoons may be either forward initially with task-force scouts or with the counterreconnaissance force and moved to in-depth positions as the enemy closes or they may be positioned in-depth initially. If they are positioned forward, the improved TOW vehicles (ITVs) should move after the initial salvo or they will be overrun before they can reposition themselves. The ITV is too slow to run from the enemy. Any TOWs positioned forward establish antiarmor ambushes to destroy targets identified by the scouts or counterreconnaissance force. Establishing trigger lines that are identifiable in obscurity enables TOW gunners to fire within their engagement capability. The identification of far-half and near-half shots within the engagement area ensures minimal overkill in fire control.

a. Purpose. The purpose of defensive operations is to defeat the enemy's attack and to gain the initiative. Defense is a temporary measure. It is conducted to identify or create enemy weaknesses that allow the early opportunity to change to the offense. Initially outnumbered, the defender uses maneuver first to blunt the attack. Then, he concentrates combat power by counterattacking and by directing friendly strength against enemy weakness. Defensive operations should destroy the enemy by achieving one or more of the following:

- Causing an enemy attack to fail.
- Deceiving the enemy.

- Gaining time.
- Concentrating forces elsewhere.
- Controlling key terrain.
- Wearing down enemy forces before offensive operations.
- Retaining terrain temporarily.

b. Characteristics of a Successful Defensive Operation. Successive defensive operations incorporate the characteristics of preparation, disruption, concentration, and flexibility.

(1) Preparation. The defender arrives in the battle area before the attacker. He must use his early occupation of the area to prepare as thoroughly for combat as time allows. The defender is normally outnumbered at first. Thus he must use his advantage of fighting from carefully chosen prepared positions. Leaders perform the following actions:

- Plan fires and maneuver in support of their concept of the operation.
- Provide war-game enemy options.
- Analyze terrain.
- Prepare positions, routes, and obstacles.
- Register weapons, prepare range cards, mark their sectors, and clear fields of fire.
- Use available time to train for and rehearse specific tasks.
- Prepare for the opportunity to take the initiative by doing the following:
  - Prepare maneuver and fire plans.
  - Designate counterattack forces.
  - Plan a counterattack to support his defense and to enable a return to the offense.

(2) Disruption. Defensive techniques vary with circumstance, but all defensive concepts of operation should aim at spoiling the attacker's synchronization. The techniques used should counter the attacker's initiative and prevent him from concentrating overwhelming combat power against a part of the defense. The defender does this by doing the following:

- Separating the attacker's forces.
- Breaking the tempo of the attacker's operation.
- Ruining the coordination of enemy combined and supporting arms.
- Defeating or misleading the attacker's reconnaissance forces.
- Impeding the attacker's maneuver.

- Disrupting the attacker's reserves.
- Interrupting the attacker's command and control.

(3) Concentration. The defender must concentrate at the decisive time and place if he is to succeed. He must mass enough combat power to avoid defeat throughout the battle. If he is to defeat the attacker, he must obtain a local advantage at points of decision.

Leaders have little time to respond and normally have to concentrate combat power often during battle. Effective reconnaissance and security forces give the leader time to discern the form of the attack and to concentrate forces and fires against it. Periods in which the defender can develop superior combat power are brief, so concentration must be rapid and violent. Obstacles, security forces, and fires can aid in concentration.

(4) Flexibility. Defensive operations require flexible planning and execution. In exercising the initiative, the attacker decides where and when combat will take place. The defender must be agile enough to counter or evade the attacker's blow and to strike back effectively. Leaders organize their defenses to defeat any approach that the enemy might make. They add flexibility to their basic plans by designating alternate and supplementary positions in depth. Static elements of the defense organize for all-around security and plan alternate and supplementary positions that allow them to move forward, laterally, or to the rear if required. Fire planning covers all approaches and is organized to accommodate changes in priority. Whatever their specific form, defensive operations are designed to accomplish the following:

- Seize the tactical initiative locally and then generally as the entire force shifts from defense to offense.
- Maintain agility and flexibility in the use of fire and maneuver. Once the attacker has committed himself, the defender should adjust his own operation to concentrate all his efforts toward containing, isolating, and defeating the committed enemy force.
- Defeat the enemy piecemeal by delaying or slowing his movement in depth.
- Fight the enemy throughout the depth of his formations to create opportunities for offensive action against him.
- Synchronize all variable combat capability. Violent execution of flexible plans and aggressive exploitation of enemy vulnerabilities can halt the attacking force and offset or overcome the attacker's numerical advantage.

c. Planning Considerations. Planning for defensive operations begins when the commander receives a warning order or OPORD. He formulates a plan for defense that meets his requirements for the mission. The commander bases his plan upon the factors of METT-T and upon the considerations developed in the estimate of the situation. Based upon this analysis, he completes the estimate of the situation and formulates a concept of defense. He decides how to defeat the enemy, where to concentrate effort, and where to take risks. The commander must use

every resource available to offset the attacker's numerical advantage, to identify dangerous threats, and to mass combat power against the enemy's weaknesses. The terrain influences the design of the defense by its natural obstacles and potential for cover, concealment, and movement. Natural obstacles must be reinforced with man-made obstacles to enhance the strength of defensive positions and to protect the defender's maneuver.

d. METT-T Analysis. The mission, enemy, terrain, and own troops must be considered through a quick mental process. With the information available, the commander establishes his time schedule by identifying actions that must be done (time-critical tasks) to prepare his unit for the operation.

(1) Mission. The first consideration when planning a defensive operation is the mission. It defines the area to be defended or the force to be defeated. The mission must be analyzed in terms of the higher commander's overall concept.

(2) Enemy. The enemy's doctrine, habits, equipment, and probable COAs must also be considered in planning the defense. Leaders must look at themselves and their areas of operations through the enemy commander's eyes. They look for and counter vulnerabilities that the enemy may exploit. They also identify probable enemy objectives and approaches to them. In a defense against an echeloned enemy, they must know how soon follow-on forces can join the attack. If enemy follow-on forces can be delayed, the attack must be defeated in detail--one echelon at a time.

(3) Terrain and Weather. The defending force must exploit any aspect of the terrain that impairs enemy momentum or makes massing or maneuvering difficult. Defenders must engage the attacker where the terrain puts him at the greatest disadvantage. Controlling key terrain is vital to a successful defense. Some terrain may be so important to the defense that its loss would prove decisive. When terrain is a decisive factor, the leader makes it a focal point in his defense.

Weather and visibility affect how defenders organize on the ground; leaders consider these effects as they analyze terrain. The defender uses man-made obstacles to improve the natural structure of terrain, to follow or canalize enemy movement, and to protect enemy positions and maneuver. Leaders must observe the terrain from the enemy perspective. This means that they must be on the terrain to study proposed defensive areas and positions.

(4) Troops. The commander also considers the nature of his force. The mobility, protection, morale, and training of his soldiers help determine how he defends. Armor and mechanized forces can move on the battlefield even under artillery fire. Dismounted infantry can fight effectively in close terrain and in urban areas that limit mounted units.

(a) Indirect Fire Support. Indirect fires are used to enhance direct fires. Indirect fires are used to disrupt or isolate the enemy. The use of specific munitions (smoke, dualpurpose improved conventional munition deploy (DPICM), high explosive (HE) can affect the enemy in various ways. They can canalize him,



destroy him, or prevent his observation. Indirect fire is very flexible; when properly planned and employed, it contributes greatly to a unit's ability to mass the effects of its fires at the decisive place and time.

(b) Mobility, Countermobility, and Survivability. The skillful use of engineer assets allows the defender to make the most of direct and indirect fires. Countermobility operations canalize, slow, or break up enemy formations. This allows the massing of overwhelming firepower against the attacker. Survivability operations protect units from the effects of enemy firepower, thus conserving the fighting potential so that it can be applied at the decisive time and place.

(5) Time Available. The amount of time available to prepare is a crucial factor in organizing a defense. The defense is more effective when time is available accomplish the following actions:

- Reconnoiter and occupy positions.
- Fortify the ground.
- Plan fires.
- Install obstacles.
- Coordinate and rehearse maneuver, fires, and logistic support.

Time is a critical element for the defender and cannot be wasted. Small units must be able to defend with little preparation, but leaders must recognize that strong defenses take time to organize and prepare.

e. Control Measures. Control measures help the leader explain his concept and the execution of the defense. Control measures are used to

- position units.
- control movements
- distribute and control fires.
- synchronize the effects of combined arms

(1) Sector. A sector is an area designated by boundaries wherein a unit operates and for which it is responsible.

(2) Battle Position. A battle position is a defensive location oriented on the most likely avenue of approach from which a unit may defend or counterattack.

(3) Strongpoint. A strongpoint is a key point in a defensive position. It is strongly fortified and heavily armed. Around it, other positions are grouped for its protection. It has all-around orientation.

(4) Boundary. A boundary is a control measure normally drawn along identifiable terrain features and used to divide areas of tactical responsibility. Within their

boundaries, units may maneuver within the overall plan and need not coordinate closely with neighboring units unless otherwise restricted. If friendly forces are not endangered, direct fire may be placed without coordination across boundaries onto clearly identified enemy targets. Indirect fires may be used only after coordination.

(5) Engagement Area. An engagement area is one where the commander intends to trap and destroy an enemy force using the massed fires of all available weapons. Although engagement areas may be divided into sectors of fire, defensive systems are not designed for engagement areas but for avenues of approach. Engagement areas and sectors of fire are not intended to restrict fires or cause operations to become static or fixed; they are used only to concentrate fires and to take advantage of their effects.

(6) Sector of Fire. A sector of fire is an area that an individual, a weapon, or a unit must cover by fire.

(7) Target Reference Point. A target reference point is an easily recognizable permanent point on the ground used to identify enemy targets and to control fires. These points also mark the center of an area where the commander plans to rapidly distribute or converge the fires of all his weapons. The standard target symbol and target number issued by the FIST are used to designate target reference points. Once designated, target reference points are used for indirect-fire targets.

(8) Phase Line. A phase line is a line used to control and coordinate military operations. It is usually a recognizable terrain feature that extends across the zone of action. Phase lines are often used to prescribe the timing of delay operations. They can also be used as a trigger line to initiate fires of a particular weapon system.

(9) Disengagement Criteria. These criteria describe a predetermined event that must occur on the battlefield for a soldier, weapon, or unit to move to a subsequent position.

(10) Engagement Criteria. These criteria describe a predetermined event that must occur on the battlefield for a soldier, weapon, or unit to begin firing.

(11) Contact Point. A contact point is a designated, easily identifiable point on the ground where two or more units are required to physically meet to coordinate actions.

(12) Hide Position. A hide position is where a soldier, vehicle, or unit can remain so that no part is exposed to observation or direct fire.

### 3. Priority of Work.

To help the company use time efficiently, the commander should establish work priorities. Normally, these are in the SOP, but they can be modified to fit the mission. In most situations, these priorities are as follows:

- Establish security.
- Position weapon systems.
- Prepare range cards.

- Prepare firing positions.
- Emplace obstacles.
- Establish local communications.
- Stockpile ammunition, food, and water.
- Perform maintenance; rest.
- Coordinate between adjacent units.

#### 4. Security.

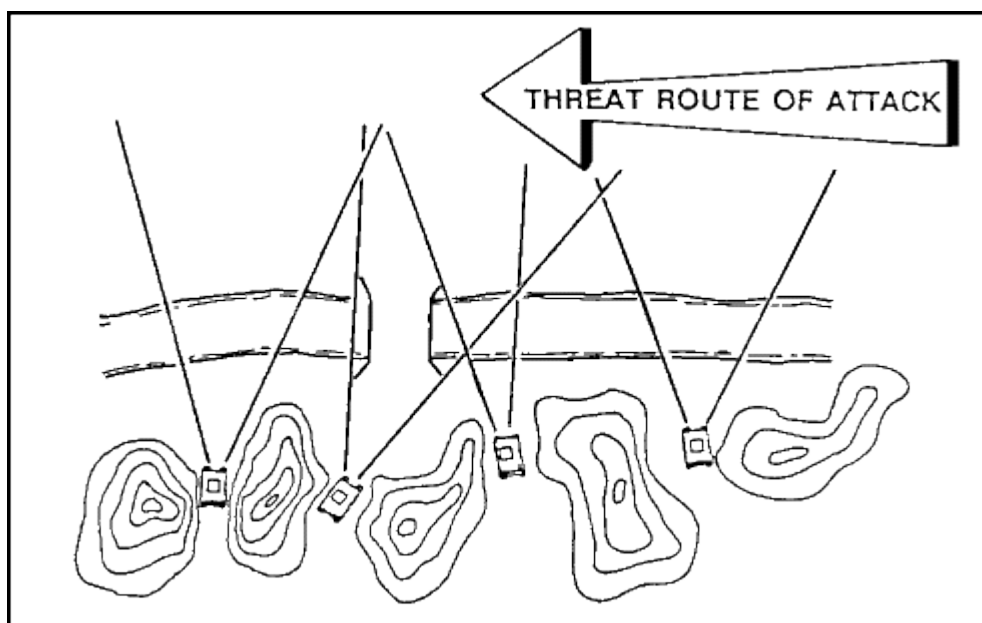
Observation posts should be established and local patrols conducted to search for enemy stay-behind forces, sensors, mines, or booby traps. Patrols should also reconnoiter any terrain that enemy reconnaissance elements could use to call for and adjust indirect fire or to direct enemy maneuver units. Patrols are used to protect emplaced obstacles, to cover dead space between units, and to cover dismounted avenues of approach. The following guidelines apply to the establishment of security:

- Emplace PEWS in dead space or between units complement the efforts of patrols.
- Position chemical detection alarms upwind from the platoon's position. Periodic checks and maintenance must be performed on the alarms; they must be moved if wind direction changes.
- Position key weapon systems. The platoon leader positions the ITVs or TOW-mounted HMMWVs.

#### 5. Improved TOW Vehicles.

Due to enemy vehicle design, which places the heaviest armor in the frontal 60-degree arc, friendly antiarmor units must try to engage these vehicles from the flank or the rear. Although the angle of engagement is important, targets normally are engaged as they appear. Therefore, leaders must position ITVs where flank engagements are most likely to occur. This means placing fighting positions to the flank of enemy avenues of approach.

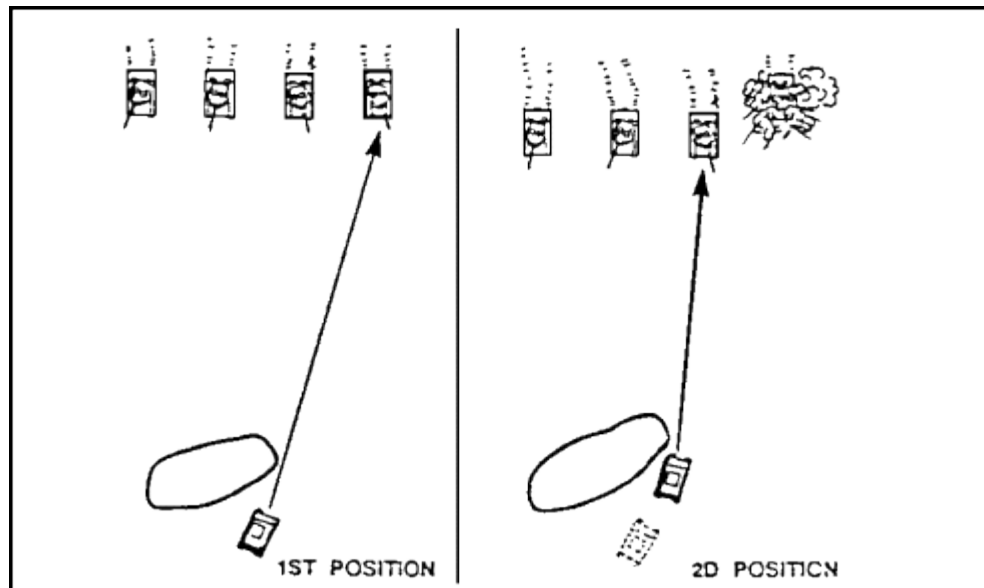
- a. Defilade Positions. Defilade positions are classified as either turret-down or hull-down. A turret-down position uses terrain to mask the ITV, and only the 3X acquisition sight is exposed to the enemy. A hull-down position exposes only as much of the ITV as needed to engage targets.
- b. Keyhole or Window Positions. Keyhole or window positions afford the ITV additional protection from enemy overwatching fire (shown in [Figure 2-16](#)). These positions limit exposure by deliberately restricting an ITV's sector of fire. The ITV is exposed only to its targets. As these targets are destroyed, it shifts to other firing positions. A keyhole position must be selected carefully so that fires can be interlocked with other ITVs in the company. The driver can vary the ITV's field of vision into its field of fire by moving toward and away from the opening to the position.



**Figure 2-16. Keyhole Positions.**

- Use a hide position when possible. Stay there until the enemy is where the unit plans to kill him. A prone or dug-in observer forward has a much smaller signature than an ITV.
- Have a backdrop, but avoid anything that catches the eye for example, an ITV positioned near a large boulder or other prominent terrain feature almost certainly will be detected.
- Position to the flank of an enemy approach and behind frontal cover. An attacker can more easily acquire and kill targets to his front than to his flanks or rear.
- Have covered routes into and out of firing positions. Put as much priority on covered routes as on the quality of firing positions. Weapons must be moved carefully to avoid diesel and dust signatures.
- Maintain 75 meters or more between primary and alternate ITV positions. Also, the greater the dispersion (in width and in depth) between vehicles, the less the likelihood that they both will be suppressed and that the detection of one will give the other away.
- Do not construct berms. Berms must be more than 20 feet thick to be effective. They also enable the attacker to spot the position more easily.
- Positions that expose weapons to large numbers of enemy systems should be avoided. If many enemy vehicles can detect and engage the defending weapon, its chance of survival is reduced. The weapons should be hidden from most of the enemy formation but should be able to engage one or two of the enemy vehicles at a time. The weapons systems crews must be able to shift their sectors of fire to engage other parts of the enemy's formation. To do this, the weapons are moved around small terrain features, as shown in [Figure 2-17](#). Such fields of fire can be a fire control measure, acting to limit the multiple engagement of the same target.

c. Battlefield Obscurants. Battlefield dust, smoke, fog, and darkness normally limit observation and fields of fire. When engagement ranges are reduced, flanking fires, the use of obstacles, and mutual support with infantry and covered and concealed positions increase in importance. Due to battlefield obscuration, weapons must be positioned to fight during limited visibility or to quickly move to limited visibility positions.



**Figure 2-17. Hidden Positions with Smaller Fields of Fire.**

6. Use of the TOW in Restrictive Terrain.

In restrictive terrain, commanders can use TOWs more often in defensive than in offensive operations. The defender can improve the battle area and he has more time for a detailed ground reconnaissance.

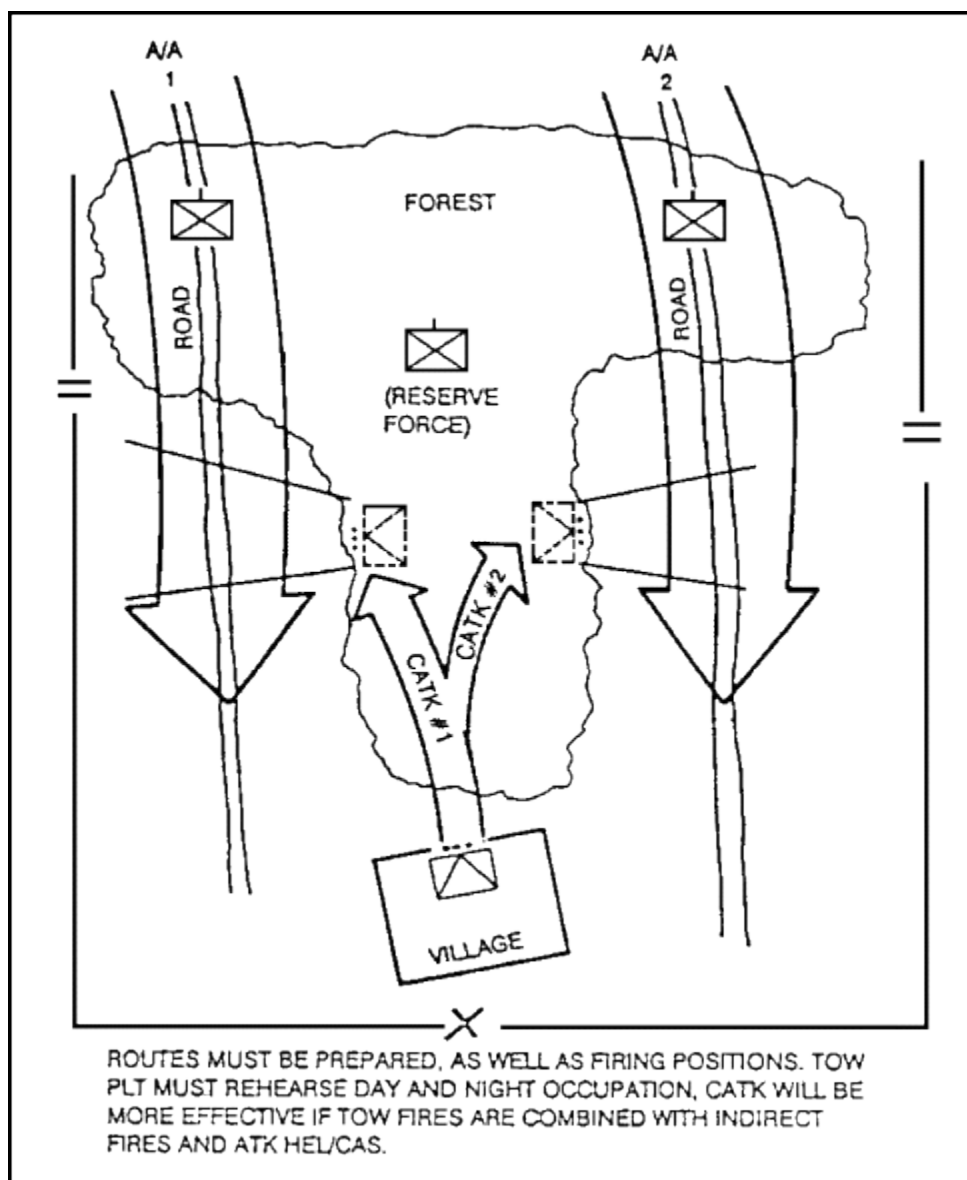
- a. Map and Ground Reconnaissance. A careful map and group reconnaissance of potential engagement areas based upon existing obstacles and mounted avenues of approach/mobility corridors is the best starting point. TOW leaders who cannot identify and use the available engagement area waste time in fruitless reconnaissance.
- b. Ambush Tactics. Units must use ambush tactics by engaging in ways that surprise the enemy and by massing fires (with volley fire). The commander or TOW leader keeps in mind the commander's concept of the operation. He determines how much massing of TOW systems he can accept based upon the artillery threat and upon the predictability of his actions to the enemy.
- c. Weapons Integration. The integration of all weapons so that all fires (ATGM, AT4, small arms, and indirect fires) impact in the engagement areas created by obstacles (existing and reinforced) is the most desirable method for destroying enemy formations. When the defender's fires overwhelm the enemy, each part of the defense is protected; the enemy cannot afford to concentrate upon one element at a time. However, if the defenders engaged the enemy in sequence--for example, TOWs fired before Dragons, which fired before infantry--the enemy could counteract or could suppress these elements as soon as they engaged.

d. Enemy Smoke. The TOW units must assume that a mounted enemy will use preplanned smoke to cover his movement across the more open danger areas or engagement areas. While TOW 2-equipped units can see and fire through most kinds of smoke, TOW leaders must ensure that they have prepared good range cards so that the gaps are covered.

e. Placement of TOWs in Reserve. In some cases, leaders may find no suitable engagement area along the forward edge of the battle area (FEBA) or terrain deeper inside the battalion sector may offer better TOW shots. In these cases, TOWs can be placed in reserve with several clearly defined missions in which they move to hasty firing positions to counterattack or block enemy penetrations. Routes and firing positions must be prepared; the TOW platoons must rehearse daytime and nighttime occupation.

Counterattacking works best when TOW fires are combined with indirect fires and CAS (shown in [Figure 2-18](#)). TOW units must rehearse these missions; they need engineers to construct at least hasty vehicle firing positions or better still, to reinforce existing natural positions. If only one good engagement area exists, commanders may position TOWs to cover it from the start.

f. Engineer Support. In all defensive operations, TOWs require engineer support. Constructing TOW positions by hand is very time-consuming. Since engineer support is always limited, the commander must make a difficult METT-T decision. In many cases, however, engineers can begin the construction by loosening or excavating dirt and TOW crews can complete the construction. In very wooded terrain, engineer bulldozers can also create rough paths for fire lanes or trails for "rapid" vehicle movement.



**Figure 2-18. TOW Platoon as a Reserve.**

## LESSON 2

### PRACTICE EXERCISE

**Instructions** The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

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**Situation:** You are seeking signatures indicating the possible presence of enemy soldiers, tracked vehicles, antitank weapons, or obstacles and mines, and tanks. Use this situation to answer questions 1 and 2.

1. You observe a dismounted soldier looking through a periscope-type device. This signature indicates the possible presence of enemy
  - ☐ A. tracked vehicles.
  - B. antitank weapons.
  - C. obstacles.
  - D. mines.
2. In an effort to determine whether a tank is friendly or hostile, you can examine the vehicle's suspension system, turret, main gun, and
  - A. flanks.
  - B. tracks.
  - C. top.
  - D. commander's station.

**Situation:** During an exercise, you are practicing estimating the range of various targets from your position by first looking at the targets with the naked eye. Use this situation to answer questions 3.

3. You can recognize a target as soldiers and a mortar. You estimate the range of these targets to be within how many meters of your position?
  - A. 250.
  - B. 500.
  - C. 1,000.
  - D. 2,000.



4. You later recognize an armored personnel carrier by its model. You estimate the range of this target to be within how many meters of your position?
- A. 250.
  - B. 500.
  - C. 1,000.
  - D. 2,000.
5. Later, you sight a target through 7-power binoculars and recognize the target by its model as a tank. You estimate the range of this target to be within how many meters?
- A. 1,000.
  - B. 2,000.
  - C. 3,500.
  - D. 4,000.

Situation: During an upcoming combat mission, you want to ensure that your squads will be able to operate should radio communications be interrupted. Use this situation to answer question 6.

6. You use which of the following fire control methods?
- A. Sectors of fire and engagement areas.
  - B. Target reference points.
  - C. Phase lines.
  - D. Engagement priorities.

Situation: You are the commander of an antiarmor company. You have received and analyzed a mission and issued the warning order. You are now making a tentative plan. Use this situation to answer questions.

7. As a result of making a tentative plan, you should
- A. issue any new information you have pertaining to the mission.
  - B. have a concept of operation, including a scheme of maneuver and a fire support plan.
  - C. understand the logistical problems and operations of the mission.
  - D. be able to ensure the success of your mission.
8. You are using METT-T analysis as an analytical framework for planning combat operations. You use OCOKA to focus on questions about the
- A. time available.
  - B. enemy.
  - C. terrain and weather.
  - D. mission.

## LESSON THREE

### IDENTIFY BATTLEFIELD POSITIONS AND SPECIAL MISSIONS AND OPERATE IN AN NBC ENVIRONMENT

#### OVERVIEW

##### **TASK DESCRIPTION:**

In this lesson, you will learn to identify positions on the battlefield and special missions and how to operate in an nuclear, biological, and chemical (NBC) environment.

##### **LEARNING OBJECTIVE:**

**TASKS:** Identify battlefield positions and special missions and operate in an NBC environment.

**CONDITIONS:** You will be given access to information from [FM 7-91](#).

**STANDARDS:** Identifying battlefield positions and special missions and operating in an NBC environment will be in accordance with [FM 7-91](#).

**REFERENCES:** The material contained in this lesson was derived from the following publication:

[FM 7-91](#)

#### INTRODUCTION

The antiarmor company and battalion have a number of battlefield positions from which to choose in locating TOWs and other antiarmor weapons systems. These are the mounted position, the dismounted position, the hunter-killer position, and the urban terrain position, each with its own requirements and considerations. Efforts must be made to protect antiarmor weapons systems and to increase their survivability by decreasing their vulnerability to enemy direct- and indirect-fire weapons and armor. Special missions for which the TOW may be used are rear operations, the role of the reserve, and security operations. Combat may expose antiarmor personnel, vehicles, and equipment to enemy nuclear, biological, and chemical contamination. It is necessary to be able to identify various contaminants, to protect against these contaminants, and to administer first aid to soldiers affected by these contaminants. This lesson will teach you how to identify battlefield positions and special missions and how to operate in an NBC environment.

#### **PART A - IDENTIFY POSITIONS ON THE BATTLEFIELD AND SPECIAL MISSIONS**

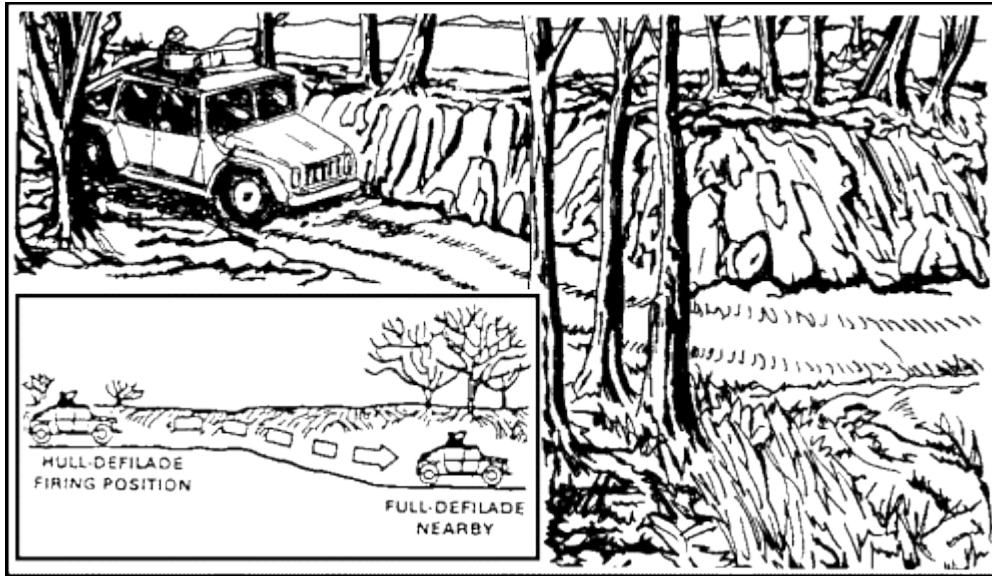
##### **1. Types of Antiarmor Positions.**

There are four types of antiarmor firing positions:

- Mounted position.
- Dismounted position.
- Hunter-killer position.
- Urban terrain position.

These four positions are discussed in the following subparagraphs.

- a. **Mounted Position.** The mounted firing position is characterized by a hull-down posture where the TOW vehicle is behind either natural or constructed cover with only the TOW launcher exposed. Natural cover (shown in [Figure 3-1](#)) is best and is the easiest cover to prepare and camouflage.



**Figure 3-1. Natural Hull-Down Position.**

When natural cover is not available, hull-down positions can be excavated with engineer assistance, as shown in [Figure 3-2](#).



**Figure 3-2. Excavated Hull-Down Position.**

When hide positions are used, the primary firing positions should also be hull-down, as shown in [Figure 3-3](#). If enemy fire is accurate, hull-down positions should be selected or constructed so that the TOW vehicle can move quickly to complete defilade. Routes into and out of hull-down positions should also have complete defilade.

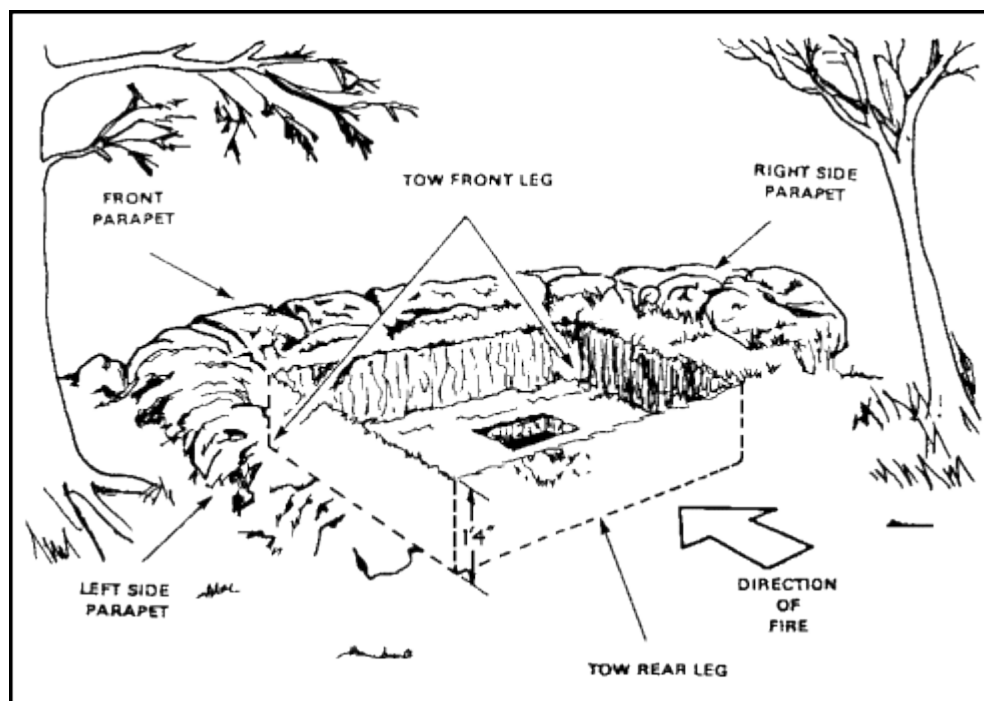


**Figure 3-3. Hide Position to Hull-Down Position.**

b. Dismounted Position. The dismounted position must protect squads from direct and indirect fires through cover and concealment. It is usually dug in with overhead protection, is intended to be retained, and is quite large. Overhead protection must allow for the bridge clamp to be raised and for inserting the indexing lugs on the encased missile into the launch tube indexing slots. As a result, overhead cover is usually used only when it can be properly camouflaged and concealed. The organic machine gun should also be positioned for self-defense.

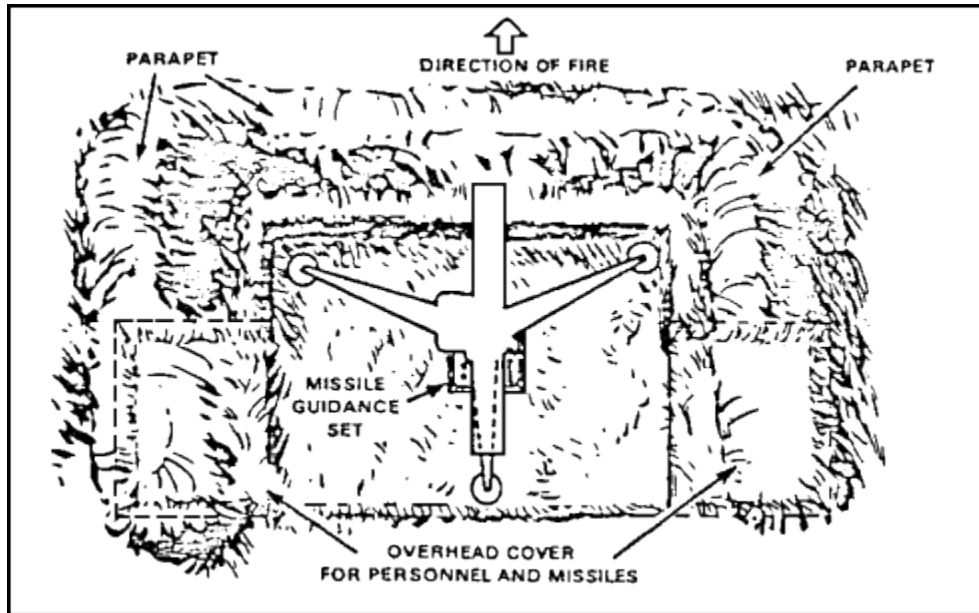
Keep the following principles in mind when using the dismounted position:

- When constructing a dismounted position, the squad keeps the TOW system mounted in its vehicle and prepares a range card until the position can support and protect its employment. Only the tripod is used to outline the dismounted position, as shown in [Figure 3-4](#).



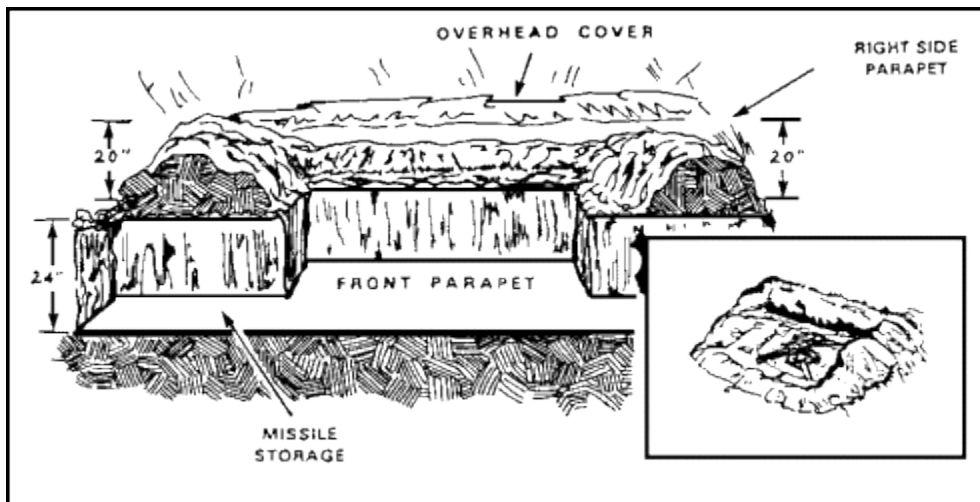
**Figure 3-4. Outline of Dismounted Position.**

- A parapet to the front and the flanks, at least 18 inches thick, provides added protection against small-arms fire and from mortar and artillery fragments. There must be nine inches of clearance between the bottom of the launcher tube and the parapet. A hole is dug between the tripod legs for the missile guidance set, as shown in [Figure 3-5](#). To ensure adequate line-of-sight clearance, from 500 to 900 meters in flat terrain, the position should not be more than 24 inches deep.



**Figure 3-5. Position of Missile Guidance Set.**

- Overhead protection is provided for squad personnel and missiles by digging squad positions on each side and to the rear of the position, as shown in [Figure 3-6](#).
- The overhead cover is built at ground level to make the position more difficult to detect. Logs that are four to six inches in diameter, covered by about 12 to 14 inches of dirt, provide adequate protection against mortar or artillery fragments.



**Figure 3-6. Overhead Cover.**

- To keep the position dry, a layer of waterproof material, such as packing material or a poncho, should be laid over the logs before adding the dirt. If sandbags are used, they should also be covered with waterproof material since they become heavy when they are wet and can cause a cave-in.

c. Hunter-Killer Position. To conduct a hit-and-run antiarmor ambush, a small position may be created that is just large enough to conceal the system and crew until the ambush is executed. These positions use no overhead cover and normally take advantage of existing terrain features such as folds in the ground.

d. Urban Terrain Position. When antiarmor units are employed in urban terrain, the same considerations for position selection apply.

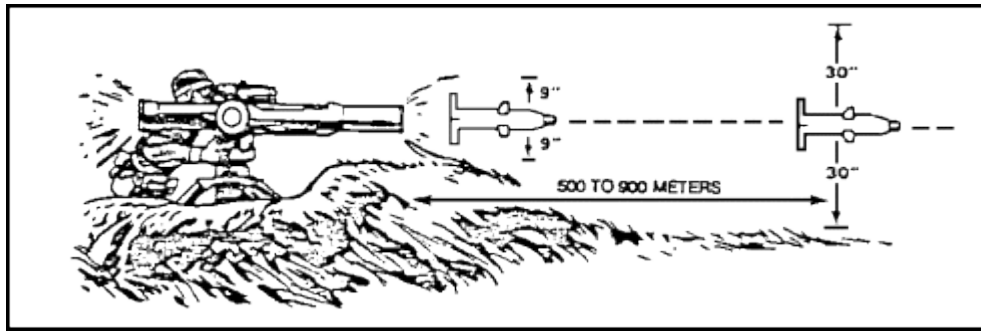
(1) Firing From a Building. Other considerations apply if the TOW is to be fired from a building only when the following conditions exist:

- The building is sturdy.
- The ceiling is at least two meters (seven feet) high.
- The room is at least five meters by eight meters (17 feet by 24 feet).
- There are two square meters (20 square feet) of ventilation to the rear of the system (an open door two meters by one meter (seven feet by three feet) provides that much ventilation).
- Glass is removed from all windows and doors, the floor is swept, and furniture and other objects that could be blown around are removed from the room.
- Everyone in the room is wearing earplugs and ballistic eye protection and is positioned forward of the rear end of the launch tube.

(2) Firing Limitations. Urban terrain affords the TOW squad improved conditions to maximize cover and concealment; however, firing limitations must be considered. Two clearance requirements ensure that a missile will not hit the ground before reaching a target:

- There should be at least nine inches of muzzle clearance around the end of the launch tube, as shown in [Figure 3-7](#). This ensures that the wings and control surfaces do not hit anything when they extend after the missile clears the launch tube. If the wings are damaged or if they catch on an object, the missile will fly erratically or go to the ground.





**Figure 3-7. Clearance Requirements.**

- There should be at least 30 inches of clearance between a gunner's line-of-sight to a target and any obstruction between 500 and 900 meters from the firing position, as shown in [Figure 3-6](#).

If line-of-sight clearance is less than 30 inches, the probability of the missile hitting the ground or an obstruction is increased. [Figure 3-8](#) shows the probability of survival for the TOW. A missile does not precisely follow a gunner's line-of-sight to the target.

Height of Line-of-Sight Above the Ground			
	18 Inches	20 Inches	30 Inches
200 Meters	.98	.98	1.0
300 Meters	.95	.96	1.0
Range to 400 Meters	.91	.91	.98
Target 500 Meters	.86	.91	.98
1.000 to 3.000/3.750 Meters	.56	.61	.93

**Figure 3-8. Probability of Survival for the TOW.**

## 2. Battlefield Positions.

One of the biggest challenges faced by an antiarmor company commander is deciding where to position his platoons on the battlefield. This decision must include an analysis of the terrain, measures to protect the weapons systems, and measures to ensure mutual support between platoons.

- Analyze Terrain. The first consideration in positioning the TOW system is to exploit every advantage offered by terrain for using the armor-killing capabilities of the TOW. In analyzing the terrain, the following principles are kept in mind:
  - The antiarmor company commander must analyze all armor avenues of approach into the battalion sector. This analysis also should include all trafficable areas that provide cover and concealment, such as woods, or draws that the enemy could use to counter the TOW. This analysis should be made from the enemy's point of view. For example, what size force can be deployed and controlled on the approaches and where are the positions

that can be used for overwatch? Much of this information can be obtained from the IPB performed by the battalion S2.

- Once the terrain has been analyzed from the enemy's perspective, the company commander then analyzes the terrain to identify potential armor engagement areas. He selects areas along the avenues of approach where the enemy will be most vulnerable to concentrated antiarmor fires. The areas selected influence how the battalion commander deploys his forces in the defense. Therefore, when the antiarmor company commander participates in the initial estimate process with the battalion commander, he recommends antiarmor engagement areas based upon his terrain analysis. The armor engagement areas that the battalion commander selects may be forward of the FEBA or within the main battle area. Their locations determine where the battalion commander will allocate supporting fires and place obstacles and mines.
- The antiarmor company commander selects flank shot positions throughout the depth of the battle area. From these positions, his platoons engage the enemy as he moves deeper into the main battle area. The positions selected must give the TOWs good fields of fire into the engagement areas. They must offer flank and rear shots along the avenues of approach and be located for mutual support and support by other weapons systems. The company should be able to mass fires into the engagement areas while keeping the TOW systems dispersed in the battle area.

b. Protect the TOW Systems. To survive and contribute to the defense, the TOW systems must be positioned where they are protected from enemy direct fire and indirect fire and from mounted or dismounted assault. If possible, engineer support should be obtained for constructing survivability positions. In preparing survivability positions, keep the following principles in mind:

- The positions must be on terrain that provides natural or man-made cover and concealment. In the defense, use of concealment is the best way to surprise the enemy. When the scheme of defense is concealed, the enemy has trouble coordinating his fires and the maneuver of his forces against specific targets. The use of fires from flanking positions and the proper use of the TOW's standoff are excellent ways to provide protection from enemy fires.
- Protection from mounted assaults is gained by positioning the TOW system on terrain that restricts the movement of vehicles. Restricted terrain includes such features as forested areas, marshy ground, steep slopes, or built-up areas. Engineer support may be available to improve fields of fire or to create or improve obstacles.
- The defense of the TOW systems from dismounted infantry attack can be achieved in several ways. One way is to position antiarmor squads or sections with the infantry elements. Another is to position infantry along avenues of approach leading to the TOW positions. A third is to reposition reserve or uncommitted forces to counter dismounted attacks after they are discovered.



c. Provide Mutual Support. Mutual support provides some protection for weapons and crews by ensuring complete, continuous coverage of engagement areas and avenues of approach. TOWs are positioned so that their fires interlock with the fires of other TOWs and antiarmor weapons systems (tanks, Dragons, AT4s). Also, they are positioned so that their fires can engage enemy armored vehicles assaulting other TOW positions.

d. Reduce Vulnerability. The antiarmor company commander takes the following steps to reduce vulnerability to enemy suppressive fire:

- Avoids positioning platoons on easily-targeted terrain features.
- Designates on-order platoon positions throughout the battle area to aid in quickly deploying platoons once they have been targeted.
- Selects positions masked by terrain from which to fight.
- Enforces the use of camouflage, concealment, and OPSEC.
- Plans movement on covered routes to subsequent positions.
- Plans smoke to obscure movement and to suppress likely enemy overwatch positions.

e. Identify Disengagement Points. In addition to selecting primary and alternate positions for his platoons, the company commander must identify disengagement points for his platoons. Disengagement points are selected by the commander so that he knows when to order his platoons to move to their next positions. The location for the disengagement point for each platoon is based upon the Threat and on the terrain.

If the commander wants his platoons to displace before they are in tank or BMP range, then he must determine where the Threat will be when he orders the platoons to move. If the terrain is open and unrestricted, the disengagement point must be farther out to allow the platoons time to displace. Conversely, if there are existing or reinforcing obstacles in front of the platoon position, the disengagement point can be closer.

The company commander must establish rules for disengagement if communications are lost. For example, the platoon and squad leaders could be told to displace, with or without orders, when the enemy reaches a certain point on the ground

Disengagement from terrain-masked positions is simplified because units are protected to their front from enemy direct-fire weapons. However, smoke should be used to conceal movement under any circumstances.

The company commander should have his platoons rehearse the disengagement to ensure that all squads know where to go and the route to use. Rehearsals also give the soldiers a better understanding of how the battle will be fought.

f. Engage the Enemy from the Flank. Frontal fire must be avoided. It attracts attention and is therefore deadly. In addition to being able to fire from the flank, the weapon should be sited so that it is in defilade from the enemy's direction. Also, concealment of the launch signature, not only from trailing tanks but from overwatch forces as well, is essential.

### 3. Special Missions.

A mix of antiarmor and maneuver platoons can be organized under the antiarmor company headquarters. This mixed unit can be employed as a reaction force in support of rear operations, as a higher unit reserve, or as a security/counterreconnaissance force.

- a. Rear Operations. Rear operations are any operations in rear areas that protect units, lines of communications, installations, and facilities from enemy attack or sabotage. Although CS and CSS units operating in the rear set up their own defenses, they may require the greater protection of combat forces if the enemy breaks through or launches special operations in the rear area. During these rear operations, the company acts as a reaction force. The unit must be prepared to respond in a specific amount of time. The unit SOP should address these readiness conditions. Dispersion and camouflage must be weighed against responsiveness. Preparing for these operations requires the same preparations as for any mission. The area of responsibility must be reconnoitered and forces must be organized to best accomplish the attack. A CP must be set up to provide the best possible command and control. The rear area operations center, base cluster operations center, base defense operations center, installation commanders, unit commanders who are being supported, and the military police (MPs) who act as the response force must coordinate plans for the defense of rear area installations and activities. As the combat force, the company/team provides security, destroys known forces in the area, and provides primary combat power to the rear area.
- b. Role of the Reserve. The TOW company/team can act as a reserve because of its firepower and mobility. Reserve forces at battalion level may consist of only those forces that are neither engaged nor assigned to be a dedicated reserve. As a dedicated or designated reserve, the company/team must be prepared for action at any time. As a standard reserve, the company/team is concerned with rear operations, counterattack, and relief operations.
- c. Security Operations. Counterreconnaissance, a subset of security, prevents hostile observations of a force, area, or place. The security or counterreconnaissance force prevents the main body from being observed or surprised by an enemy attack or reconnaissance probe. These operations are conducted forward, to the flanks, or to the rear of the battalion. The company/team can screen the battalion at great distances. Ideally, the antiarmor commander can be used as the counterreconnaissance coordinator. By placing scouts, tanks, and TOWs under the antiarmor commander's control, the battalion commander obtains a unified counterreconnaissance operation. The scouts are used to identify the composition and direction of movement of the enemy reconnaissance. The antiarmor commander can then use the tank and TOW assets to fix, fight, or delay the enemy. This provides the battalion with the time and space to position forces to fight the enemy.

### 4. Alternative Missions for Units with TOW HMMWV.

At times, units are unable to employ TOWs. Also, infantry battalions (especially those with more than one TOW platoon) face tactical situations in which they cannot use all their TOWs. They may move to terrain so rugged or impassable that Threat armor cannot operate in it--for example, mountains, hills, or forests/jungles with thick undergrowth that blocks ATGM wires and restricts visibility. Also, infantry

battalions might fight an enemy who has no armor or who has only lightly armored vehicles such as APCs. Based upon his METT-T analysis, the commander may decide to use TOW units in alternative roles. He must devote training time for practicing these skills even though the principles of direct-fire suppression differ little from the principles of TOW employment. Commanders should train to use TOWs for alternative missions to make the best use of a combat subunit that has its own transportation, communications, and organized leadership. Some alternatives are discussed in this paragraph.

- a. Observation Posts. TOW units can man observation posts (OPs) either dismounted or mounted, although dismounted OPs are often the better. The powerful day tracker (and thermal night tracker for TOW 2) allows TOW squads to effectively detect movement. TOW platoons can operate either independently or under OPCON of the scout platoon.
- b. Traffic Control Points. TOW squads can operate traffic control points (TCPs) to mark routes, to mark critical points, and to direct traffic during tactical motor and foot marches. Doing so allows the scout platoon to concentrate upon reconnaissance that is directly related to tactical missions. TOW squads operate TCPs best during motor marches, but they can do so (dismounted) during foot marches as well.
- c. Antivehicular Ambush. TOW units can perform antivehicular ambushes as an economy-of-force measure to kill enemy reconnaissance vehicles. For example, TOW platoons can set up a series of ambushes to the flank of an enemy battalion that is defending in depth in a forest. Having TOW units perform this mission eliminates the need to pull infantry squads away from their companies to do it. Normally, terrain prohibits TOW use. The TOW unit uses AT4s and M21 mines reinforced with Claymores, M249 machine guns, and M203 grenade launchers. The TOW section is the smallest element that can conduct an ambush alone. TOW sections can also conduct antipersonnel ambushes when armor is not a threat.
- d. Security Force. In military operations on urbanized terrain (MOUT), TOW platoons can relieve rifle platoons holding secured city blocks, freeing these platoons for other missions.
- e. Carrying Parties. In mountain warfare or, more often, in MOUT, TOW platoons can become carrying parties, moving supplies forward and carrying wounded back. TOW platoons can perform these tasks either mounted or dismounted.
- f. Provisional Heavy Machine Gun Sections. Except for mechanized infantry TOW units, most TOW units in infantry battalions are issued MK 19 40-mm machine guns and .50-caliber M2 machine guns as supplemental weapons. Both are excellent direct-fire suppression weapons, especially against enemy infantry, lightly armored vehicles, and fortifications. TOW sections operating heavy machine guns can offer support by fire. In most cases, TOW sections in this role employ the machine guns dismounted, although the section transports the guns and ammunition in its HMMWVs after cross-loading TOW missiles. The HMMWV's high silhouette and light armor could prevent it from being used as a machine gun platform.

## **PART B - OPERATE IN AN NBC ENVIRONMENT**

1. Nuclear, Biological, and Chemical (NBC) Operations.

The Threat considers chemical hazards a normal condition on the battlefield. He uses chemicals during both defensive and offensive operations and is prepared to accept casualties and reduced efficiency in exchange for tactical gain. Planning for the use of nuclear and chemical weapons as well as for protective measures against enemy nuclear, biological, and chemical (NBC) weapons must be routine.

## 2. Planning Considerations.

NBC weapons add a new dimension to the battlefield. They can produce massive casualties that overtax the medical evacuation (MEDEVAC) and replacement systems, create heat and psychological casualties, and degrade speed and accuracy in gunnery. Training, SOPs, and an accurate mission-oriented protective posture (MOPP) analysis are keys to reducing casualties and enhancing a unit's ability to continue operations in an NBC environment.

- a. Chemical Contamination. During chemical contamination, units and individuals lose their identities, command and control deteriorate, and all simple human tasks, such as eating, sleeping, moving, and passing body wastes, become difficult, complicated, unclean, and miserable.
- b. Defense Against NBC. Defense against NBC means more than self-protection. Units must prepare to take educated, calculated risks. Casualties are the price of waging war. NBC is a condition, not a task. The reduction of capabilities that results from using MOPP gear must be weighed against potential casualties that might result if MOPP gear was not used during an NBC attack. Going too far in either direction can reduce combat power to unacceptable levels. NBC defense doctrine emphasizes "mission-oriented" when discussing mission-oriented protective posture. MOPP gives commanders the flexibility to maintain combat capability at the highest level possible in contaminated conditions. This process is called MOPP analysis, and is summarized in [Figure 3-9](#).

<u>MOPP Level</u>	<u>Overgarment</u>	<u>Booties</u>	<u>+Mask/Hood</u>	<u>Gloves</u>
0	*stored nearby	*stored nearby	carried	*stored nearby
1	worn opened or closed, based on temperature	carried	carried	carried
2	same as MOPP1	worn	carried	carried
3	same as MOPP1	worn	worn, hood opened or closed, based on temperature	carried
4	worn closed	worn	worn	worn
+Includes M258A1 kit, detector paper, and three NAAK MARK 1 injectors.				
*In combat vehicle or at duty location.				

**Figure 3-9. MOPP Levels and Protective Equipment.**

c. Balance Between Defense Against NBC and Mission Accomplishment. Training for defense against NBC must balance with mission accomplishment. It should include techniques of decontamination and MOPP relief used to rebuild combat potential. In combat, the enemy--not the contamination--should be the focus. Contamination is considered part of IPB and the commander's estimate of the situation.

### 3. Chemical Combination.

Protection can be improved by locating, identifying, and reporting NBC hazards; by warning about NBC hazards; and by using passive measures. Passive measures decrease the probability of attack by reducing target signature and improving survivability. These measures include cover and concealment, dispersion, operations security (OPSEC), and signals security (SIGSEC).

- a. Avoidance of Contamination. Avoidance can be achieved by locating and marking contaminated areas along routes, in battle positions, and in assembly areas. Reconnaissance and quartering parties should be prepared to do this. Locating and identifying the type and concentration or density of contamination allows development of a plan to bypass, cross, or operate in a chemical or radioactive hazard.
- b. Detection of Liquid Contaminants. In addition to alarms, M9 paper can detect liquid contaminants. Strips of M9 paper taped to clothing, equipment, and vehicles can provide the first warning that a contaminated area has been entered or a chemical attack is occurring. However, since the paper can also react to nonthreatening liquids, the M256A1 chemical agent detector kit must be used to verify contamination.
- c. Symptoms of Contamination. Affected soldiers show signs of exposure to chemical contamination through their physical reactions. However, physical symptoms of a chemical agent can be similar to reactions to toxins. Therefore, an M256A1 kit or M8 paper should be used to verify chemical contamination when symptoms, such as those listed in [Figure 3-10](#), appear.

<u>Type of Agent</u>	<u>Nerve</u>	<u>Blister</u>	<u>Blood</u>	<u>Choking</u>
Normal means dissemination	Aerosol or vapor	Liquid	Vapor	Vapor
Symptoms	Drooling, difficulty breathing, nausea, vomiting, convulsions, blurred vision	No early symptoms (mustard, nitrogen mustard); burning eyes, stinging skin (lewisite, mustard lewisite); irritated eyes and nose (phosgene oxine)	Convulsions and coma	Coughing, choking, nausea, headache, tightness in chest

**Figure 3-10. Symptoms Caused By Chemical Agents.**

The effects of chemical agents are shown in [Figure 3-11](#).

<u>Type of Agent</u>	<u>Nerve</u>	<u>Blister</u>	<u>Blood</u>	<u>Choking</u>
Effects	Incapacitates (inhaling high concentrations may cause death)  Incapacitates (if skin is not decontaminated immediately, may cause death)	Blisters skin, respiratory tract (may cause temporary blindness)  Some agents sting and form wheals on skin	Incapacitates (inhaling high concentrations may cause death)	Floods and damages lungs (may cause death)

**Figure 3-11. Effects of Chemical Agents.**

d. First Aid, Decontamination, and Protection. The methods of first aid, decontamination, and protection for nerve, blister, blood, and choking agents are shown in [Figure 3-12](#).

<u>Type of Agent</u>	<u>Nerve</u>	<u>Blister</u>	<u>Blood</u>	<u>Choking</u>
First Aid	Use nerve agent antidote Mark 1 (artificial respiration may be needed)	Do the same as for second- or third degree burns	Give amyl nitrate (use artificial respiration if needed)	Avoid moving patients and keep them warm if their symptoms are severe
Decon-	Use M258A1 kit  Flush eyes with water, decontaminate skin with M258A1 kit	Flush eyes with water, decontaminate skin with M258A1 kit or wash with soap and water	None	None
Protection	Protective mask and clothing	Protective mask and clothing	Protective mask	Protective mask

**Figure 3-12. First Aid, Decontamination, and Protection for Chemical Agents.**

4. Biological Contamination.

No method exists to detect biological agents (including toxins). Increased illness, however, could indicate the existence of a biological threat. Toxins act much faster than biological agents. The best defense against biological agents is to make sure that hygiene discipline, field sanitation, and preventive medicine measures are enforced.

5. Nuclear Contamination.

A nuclear hazard requires additional protective measures.

a. Battalion Level. A battalion task force sends no nuclear warning (NUCWARN). Battalion is the lowest level to receive a NUCWARN or chemical warning (CHEMWARN). Instead, battalion sends specific instructions about actions that should be taken. This is a brief message that contains the following:

- A proword indicating that the message is a nuclear strike warning.
- A directive to the team to observe a specific nuclear defense level or to evacuate the area.
- The expected time of burst.
- The direction of burst.

b. Maximum Protection. For maximum protection, the TOW unit must do the following:

- Position armored vehicles to reduce blast damage and radiation exposure:

- By orienting ITVs toward the strike location with the turrets stowed.
  - By removing TOW missiles from the launcher and stowing them.
  - By closing and securing all hatches.
  - By covering all vision blocks and sights.
  - By evacuating wheeled vehicle, ITV, and APC personnel to bunkers, if available. (Only personnel buttoned up in tanks and bunkers are considered to be under maximum protection).
  - Use sandbags for radiation shielding, if available.
  - Remove or secure and cover equipment that is stowed on the outside of the vehicle.
  - Take down antennas and disconnect all cables, including handsets, from all radios except a few mission-essential sets to monitor specific nets as required by SOP.
- c. Minimum Protection. For minimum protection, the TOW unit must do the following:
- Assume positions at the bottom of hills if it is moving and has no time to dig in.
  - Evacuate personnel from wheeled vehicles.

## 6. Biological and Chemical Contamination.

After being contaminated by biological or chemical agents, the unit must decontaminate somewhat before the protection level is reduced below MOPP4. The same decontamination procedure is used for both biological (including toxins) and chemical contamination.

- a. Quick Decontamination. A TOW squad can direct the following quick decontamination actions:
- Decontaminate skin with the M280 squad wipes or M258A1 kit.
  - Wipe personnel and equipment with the M280 decontamination kit individual equipment (DKIE).
  - Spray the operator with the M13 decontamination apparatus portable (DAP). Spray vehicle exits and entrances and any areas necessary for operation with the M11 decontamination apparatus.
- b. Decontamination When Casualties Are Great. Casualties may be so great that the unit must disengage to decontaminate. This may be done by platoon, section, or squad. Decontamination by platoon offers the best command and control. Hasty decontamination should be conducted as far forward as possible, in accordance with the decontamination techniques shown in [Figure 3-13](#).



<u>Type</u>	<u>Best Start Time</u>	<u>Performed By</u>	<u>Technique</u>	<u>Effects</u>
Basic Skills	Within one minute	Individual	Skin decontamination	
	Within 15 minutes	Individual or crew	Personal wipe-down	Stops agent from penetrating
			Operator's spray-down	
Hasty Decontamination operation	Within six hours	Unit	MOPP gear exchange	Possible temporary relief from MOPP4
		Battalion crew or or decontamination squad	Vehicle wash-down	Limit liquid agent spread
Deliberate Decontamination operation	When mission allows reconstitution	Unit	Detailed decontamination of soldiers	Probable long-term MOPP reduction with minimum risks
		Decontamination platoon	Detailed decontamination of equipment	

**Figure 3-13. Decontamination Techniques.**

## 7. Nuclear Decontamination.

Nuclear decontamination can begin when fallout stops or after leaving the contaminated area.

a. Individual Decontamination. To perform individual's contamination, take the following actions:

- Brush or wash clothing and equipment thoroughly to remove dust particles. (This should be done away from the position to be occupied).
- Shower and change clothes.
- If there is a great deal of dust in the air, wear a scarf or other piece of cloth to cover the mouth and nose. (Do not use the protective mask unless there is a chemical threat. The dust will contaminate the filters).

b. Equipment and Area Decontamination. To decontaminate the equipment and area, take the following actions:

- Turn over soil (at least seven inches down) in the immediate area around fighting positions or vehicles.

- Wash vehicles and weapons using any available water source in an area away from the position.

#### 8. Organization of Nuclear, Biological, and Chemical Defense.

NBC defense teams should be organized from within the units. The teams should consist of an NBC school-trained officer, the chemical noncommissioned officer (NCO), and an enlisted alternate from company headquarters. Soldiers should also be designated and trained to operate all assigned NBC equipment and to help during decontamination operations (as an extra duty). The chemical NCO advises and aids in the NBC defense activities of the company and in training NBC equipment operators and decontamination teams. This soldier also advises the commander on organization and equipment guide (OEG) and unit decontamination operations. Aided by an enlisted alternate, the chemical NCO coordinates radiological monitoring, chemical detection, and decontamination operations. The chemical NCO should be located with the unit commander or leader. However, an alternate location might be with the first sergeant in the company combat trains. The NBC defense officer, the chemical NCO, and the enlisted alternate are trained to perform the following actions:

- Help with all NBC training.
- Receive, prepare, evaluate, and disseminate information on enemy and friendly NBC attacks.
- Inspect individual and unit NBC equipment and advise on its maintenance.
- Ensure that the basic load of individual and unit NBC equipment and supplies are maintained.
- Aid in the employment of unit detection, monitoring, survey, and decontamination teams.
- Maintain unit radiation status records from the date obtained from the IM93 tactical dosimeter.

#### 9. Defensive Operations in a Nuclear, Biological, and Chemical Environment.

Since MOPP gear prevents personnel recognition at a distance and increases the physical effort needed to move from position to position, division of authority is critical. Soldiers should expect to be hit by chemical agents while conducting defensive missions. Analysis of the terrain by the chemical NCO should be part of preparing the initial battle position. The chemical NCO identifies the areas in which agents are less likely to accumulate. This information helps in the choice of alternate platoon positions. The leader's position is critical in a chemical environment. When reaction time is reduced, operations are also reduced. Decisions must be made early, requiring commitment to a course of action that cannot be changed. Therefore, timely decisions must be made at contingency decision points where the battlefield can be seen.

#### 10. Offensive Operations in a Nuclear, Biological, and Chemical Operations Environment.

Observing MOPP4 degrades the soldier's ability to remain oriented in battle. Since chemical mines supporting obstacles pose a serious threat, infantrymen are forced into MOPP4. This hinders the breaching effort as follows:

- Movement rates of dismounted infantry are reduced.
- Target acquisition for TOWs is hindered.

- Synchronization of combat assets at critical times and places on the battlefield is more difficult.
- Platoons move more slowly and fire less often.
- Combat support arrives later.
- Combat service support lines become longer and supplies become contaminated.

## LESSON 3

### PRACTICE EXERCISE

**Instructions** The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

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**Situation:** You are conducting a hit-and-run antiarmor ambush, which will be followed by the engagement of targets within a village. Use this situation to answer questions 1 through 3.

1. To conceal your TOW and its crew until the ambush is executed, you instruct the crew to construct which of the following positions?
  - ☐ A. Mounted.
  - ☐ B. Dismounted.
  - ☐ C. Hunter-killer.
  - ☐ D. Urban terrain.
2. You ensure that there is at least how many inches of muzzle clearance around the end of the TOW's launch tube?
  - ☐ A. Five.
  - ☐ B. Seven.
  - ☐ C. Eight.
  - ☐ D. Nine.
3. Later, a TOW is to be fired from a building. Before the TOW is fired, you conduct an examination of the building. You ensure that its ceiling is at least how many meters high?
  - ☐ A. Five.
  - ☐ B. Two.
  - ☐ C. Eight.
  - ☐ D. Nine.

Situation: You are positioning your TOW weapon systems on the battlefield. Use this situation to answer questions 4 and 5.

4. In order to protect the TOWs and their crews from mounted assaults, you intend to position them on restricted terrain. Which of the following types of terrain is considered restricted?
  - A. Broad plains.
  - B. Meadows.
  - C. Rolling hills.
  - D. Forested areas.
5. To protect the TOWs and their crews from dismounted infantry attack, you
  - A. use fires from flanking positions and the TOWs' standoff.
  - B. designate on-order platoon positions throughout the battle area to aid in quickly deploying platoons once they have been targeted.
  - C. select flank shot positions throughout the depth of the battle area.
  - D. position antiarmor squads or sections with infantry elements.

Situation: You are the commander of an antiarmor company. Battalion has advised you that a nuclear attack appears imminent. Your TOW units are moving and have no time to dig in. Only minimum protection is possible. Use this situation to answer questions 6 through 8.

6. You instruct your TOW units to
  - A. assume positions at the bottom of hills.
  - B. position armored vehicles to reduce blast damage and radiation exposure.
  - C. use sandbags for radiation shielding.
  - D. remove or secure and cover equipment that is stowed on the outside of the vehicle.
7. Following the attack, you instruct your soldiers to perform individual decontamination. To remove dust particles from themselves, they move away from the position to be occupied and
  - A. Brush or wash clothing and equipment thoroughly before showering and changing clothes.
  - B. Burn clothing before showering and changing into uncontaminated uniforms.
  - C. Bury clothing and personal equipment before showering and changing clothes.
  - D. Discard clothing, shower, and change clothes.

8. To decontaminate the equipment and area, you ensure that your soldiers turn over soil in the immediate area around fighting positions and vehicles to a depth of at least how many inches?
- A. Six.
  - B. Seven.
  - C. Eight.
  - D. Nine.
-

**LESSON FOUR**  
**TYPES AND CHARACTERISTICS OF TOW MISSILES**  
**OVERVIEW**

**TASK DESCRIPTION:**

In this lesson, you will learn to identify the types and characteristics of TOW missiles.

**LEARNING OBJECTIVE:**

**TASKS:** Identify the types and characteristics of TOW missiles.

**CONDITIONS:** You will be given access to information from [FM 7-91](#).

**STANDARDS:** Identify the types and characteristics of TOW missiles in accordance with [FM 7-91](#).

**REFERENCES:** The material contained in this lesson was derived from the following publication:

[FM 7-91](#)

**INTRODUCTION**

This lesson will teach you to identify the characteristics of the following types of TOW missiles:

- Basic TOW.
- Improved TOW (I-TOW).
- TOW 2.
- TOW 2A.
- TOW 2B.

1. Types and Characteristics of TOW Missiles.

Since the development of the TOW missile, nine different types have been fielded. The first four (Basic TOW) have similar characteristics, including a range from 3,000 to 3,750 meters.

The later missiles (two Improved TOWs, TOW 2, TOW 2A, and TOW 2B) have an improved range of 3,750 meters.

[Figure 4-1](#) lists the nine different TOW missiles by type, shows how they are designated, lists their maximum ranges, and indicates the warheads they use.

Type	Designator	Max Flight Inert Practice	Range (Meters)	Warhead	Comments
Basic TOW	BGM 71A	BTM 71A	3,000	5-Inch UNITARY	
Basic TOW	BGM 71A-1	BTM 71A-1	3,000	5-Inch UNITARY	
Basic TOW	BGM 71A-2	BTM 71A-2	3,000	5-Inch UNITARY	*
Basic TOW	BGM 71A-3	BTM 71A-3	3,750	5-Inch UNITARY	**
Improved TOW	BGM 71C	None	3,750	5-Inch UNITARY W/PROBE	
Improved TOW	BGM 71C-1	None	3,750	5-Inch UNITARY W/PROBE	
TOW 2	BGM 71D	None	3,750	6-Inch UNITARY W/PROBE	***
TOW 2A	BGM 71E	None	3,750	6-Inch TANDEM W/PROBE TIP CHARGE	** ***
TOW 2B	BGM 71F	None	3,750	FLYOVER, SHOOT DOWN	
* MOIC (missile ordnance inhibit circuit) prevents missile fly-back if a command link (wire) breaks.					
** ECM (electronic countermeasure) resistant when fired through TOW 2 launcher/subsystem.					
*** The probe tip charge first penetrates the explosive reactive armor boxes and then allows the main six-inch warhead to penetrate the basic hull armor.					

**Figure 4-1. Fielded TOW Missile Types.**

## 2. Characteristics.

The TOW missile can destroy targets at a minimum range of 65 meters and a maximum range of 3,750 meters. Only five TOW missiles are of concern:

- The I-TOW, an improved TOW missile (BGM-71C), has a five-inch unitary warhead. Its extendable probe provides detonation at greater ranges, which increases penetration.
- TOW 2 (BGM-71D) has a six-inch, full-caliber warhead. It also has an extendable probe to enhance the penetration of armor, including applique armor.
- TOW 2A (BGM-71E) has all the capabilities of the TOW 2 missile. However, an explosive charge in the tip of the probe detonates the reactive armor, which allows the main warhead to penetrate the target.
- TOW 2B (BGM-71F) provides a fly-over, shoot-down (top-attack) capability that allows the most vulnerable part of the armored vehicle to be penetrated. The minimum-effective range of the missile is 200 meters.
- The basic TOW, practice (BTM-71A), has an inert warhead and is the standard training round.



### 3. Enemy Armored Protection.

[Figure 4-2](#) lists the best TOW missile to use against various types of targets. In each case, flank shots increase the probability of a single-shot kill and reduce the chance of detection/engagement by Threat armor.

Threat Vehicle	TOW MISSILE SELECTION PRIORITY			
<u>Type Targets</u>	<u>FIRST</u>	<u>SECOND</u>	<u>THIRD</u>	<u>FOURTH</u>
Tanks w/applique armor	TOW 2	TOW 2A	TOW 2B	I-TOW
Tanks w/explosive reactive armor	TOW 2B	TOW 2A	TOW 2	I-TOW
Tanks without applique/reactive armor	I-TOW	TOW 2	TOW 2A	TOW 2B
Light-armored personnel carriers	I-TOW	TOW 2	TOW 2A	TOW 2B
Light-armored wheel vehicles	I-TOW	TOW 2	TOW 2A	TOW 2B
Antiaircraft vehicles	I-TOW	TOW 2	TOW 2A	TOW 2B
Armored vehicles in hull defilade position	TOW 2B	TOW 2A	TOW 2	I-TOW
Bunkers/ FORTIFICATIONS	I-TOW	TOW 2	TOW 2A	-----

**Figure 4-2. Missile Selection.**

### 4. TOW Firing Over Water.

The range of the TOW 2 missile is limited when it is fired over water. If the guide wires get too close to the water, the signal will short.

- a. Range. The TOW missile has four configurations. Each configuration has a maximum range when fired over water, as shown in [Figure 4-3](#). Each has a maximum distance it can be fired over water with a limited range, as shown in [Figure 4-4](#).

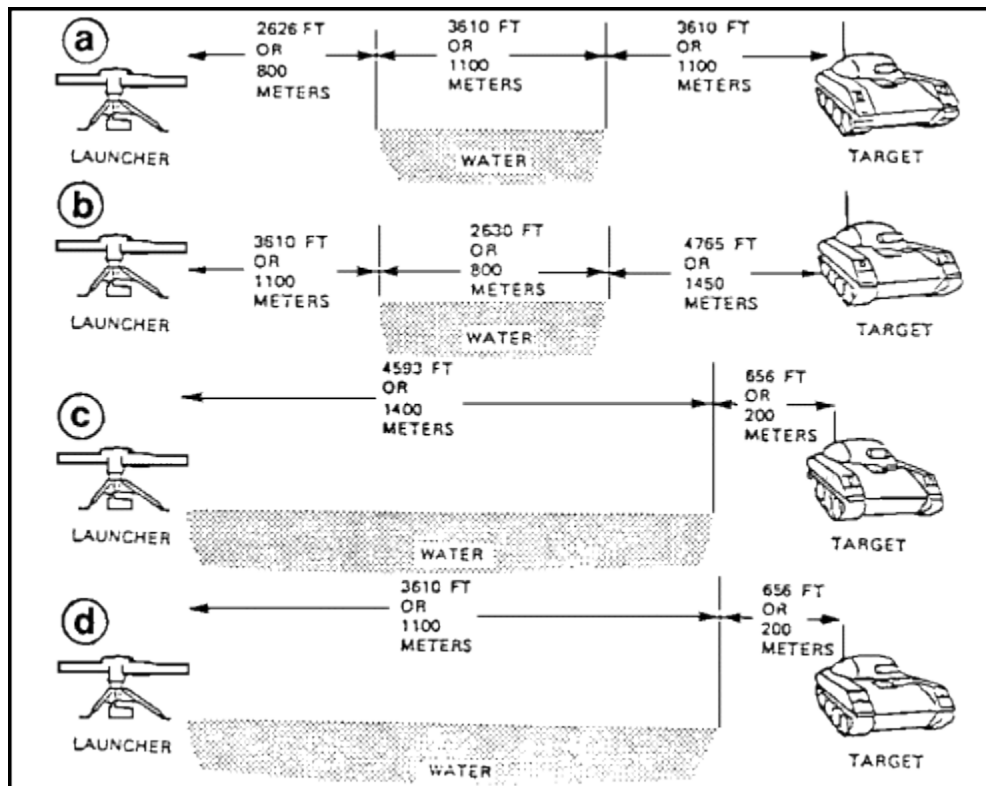
<u>Missile</u>	<u>Width of Body of Water</u>		<u>Maximum Range in Meters</u>
	<u>Meters</u>	<u>Feet</u>	
BGM-71A	1,100	3,610	3,000
BGM-71A-1	800	2,630	3,350
BGM-71A-2	1,100	3,610	3,000
BGM-71A-3	800	2,630	3,350
BGM-71C	800	2,630	3,350
BGM-71C-1	800	2,630	3,350
BGM-71D	800	2,630	3,350
BTM-71A	1,100	3,610	3,000
BTM-71A-1	800	2,630	3,350
BTM-71A-2	1,100	3,610	3,000
BTM-71A-3	800	2,630	3,350

**Figure 4-3. Maximum Range of Missiles Over Bodies of Water.**

<u>Missile</u>	<u>Maximum Distance Over Water</u>		<u>Limited Range in Meters</u>
	<u>Meters</u>	<u>Feet</u>	
BTM-71A	1,400	4,593	1,600
BGM-71A-1	1,100	3,610	1,300
BGM-71A-2	1,400	4,593	1,600
BGM-71A-3	1,100	3,610	1,300
BGM-71C	1,100	3,610	1,300
BGM-71C-1	1,100	3,610	1,300
BGM-71D	1,100	3,610	1,300
BTM-71A	1,400	4,593	1,600
BTM-71A-1	1,100	3,610	1,300
BTM-71A-2	1,400	4,593	1,600
BTM-71A-3	1,100	3,610	1,300

**Figure 4-4. Maximum Distance Over Water With Limited Ranges.**

b. Height. The missile firing ranges for the given heights above water are determined from [Figure 4-5](#). To use them the TOW 2 launcher's height above water must be determined. Next to the appropriate height in the left-hand column of the graph, place a mark. Then determine the target's height above the water. Next to the appropriate height in the right-hand column of the graph, place a mark. Connect the two marks by a straight line. The reading at the point at which the line crosses the center column is the maximum range that the missile can travel without getting too close to the water.



**Figure 4-5. Missile Firing Ranges Over Water.**

NOTE: Raising the TOW 2 launcher or target higher than the surface of the water increases the missile's firing range.

NOTE: For a measurement in feet, use either "a" or "d", [Figure 4-5](#). For a measurement in meters, use either "b" or "c", [Figure 4-5](#).

- **Example:** Ranges in Feet. Use "a", [Figure 4-5](#) to find the ranges of TOW missiles BGM-71A, BGM-71A-2, or BTM-71A-2 in feet, as illustrated by the following example:

- Line (a) shows that the missile can hit the target across a 6,480-foot strip of water when the launcher is 15 feet above the water line and the target is 35 feet above the water line.
- Line (b) shows that the missile can hit the target across a 7,416-foot strip of water when the launcher is 74 feet above the water line and the target is five feet above the water line.

- Use "b", [Figure 4-5](#), to find the ranges of TOW missiles BGM-71A, BGM-71A-2, BTM-71A, or BTM-71A-2 in meters, as illustrated by the following example:

- Line (a) shows that the missile can hit the target across a 1,600-meter strip of water when the launcher and the target are five meters above the water line.
- Line (b) shows that the missile can hit the target across a 3,000-meter strip of water when the target is one meter above the water line.

- Use "c", [Figure 4-5](#), to find the ranges of TOW missiles BGM-71A-1, BGM-71A-3, BGM-71C, BGM-71C-1, BGM-71D, BTM-71A-1, or BTM-71A-3 in feet, as illustrated by the following example:

- Line (a) shows that the missile can hit the target across a 12,300-foot strip of water when the launcher is 110 feet above the water line and the target is 20 feet above the water line.
- Line (b) shows that the missile can hit the target across an 8,970-foot strip of water when the launcher is 20 feet above the water line and the target is 60 feet above the water line.
- Use "d," [Figure 4-5](#), to find the ranges of TOW missiles BGM-71A-1, BGM-71A-3, BGM-71C, BGM-71C-1, BGM-71D, BTM-71A-1, or BTM-71A-3 in meters, as illustrated by the following example:
  - Line (a) shows that the missile can hit the target across a 3,750-meter strip of water when the launcher is 41 meters above the water line and the target is one meter above the water line.
  - Line (b) shows that the missile can hit the target across a 3,000-meter strip of water when the launcher is 10 meters above the water line and the target is 20 meters above the water line.

## LESSON 4

### PRACTICE EXERCISE

**Instructions** The following items will test your understanding of the material covered in this lesson. There is only one correct answer for each item. When you have completed the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, review that part of the lesson which contains the portion involved.

1. Since the development of the TOW missile, how many types have been fielded?  
  

☐ A. One.

B. Four.

C. Five.

D. Nine.
2. Which of the following types of TOW missile has a probe tip charge that first penetrates the explosive reactive-armor boxes of enemy armor, allowing the main warhead to penetrate the basic hull armor?  
  

A. BGM 71C.

B. BGM 71C-1.

C. BGM 71D and BGM 71E.

D. BTM 71A-3.
3. What is the maximum distance over water (in meters) that a BGM 71C-1 missile can be fired?  
  

A. 1,100.

B. 1,400.

C. 3,610.

D. 4,493.
4. What is the maximum distance over water (in feet) that a BGM 71C-1 missile can be fired?  
  

A. 1,100.

B. 1,400.

C. 3,610.

D. 4,493.